

Apr 5th, 7:30 AM - Apr 6th, 3:00 PM

## 2010 Abstract Booklet

Undergraduate Research Center, Minnesota State University, Mankato

Follow this and additional works at: <http://cornerstone.lib.mnsu.edu/urs>

 Part of the [Higher Education Commons](#)

---

Undergraduate Research Center, Minnesota State University, Mankato, "2010 Abstract Booklet" (2010). *Undergraduate Research Symposium*. 1.

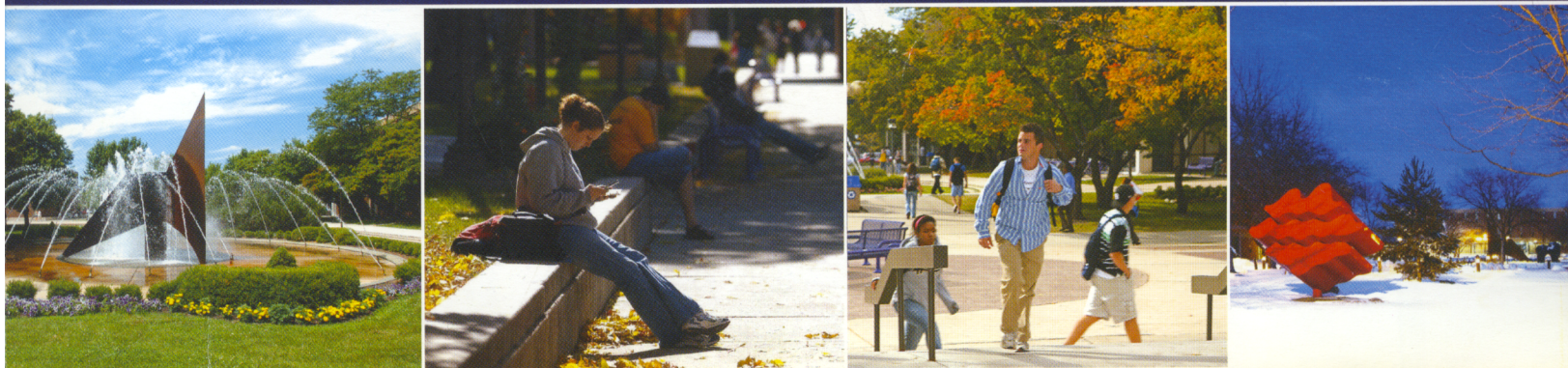
<http://cornerstone.lib.mnsu.edu/urs/2010/abstract-booklet/1>

This Event is brought to you for free and open access by the Undergraduate Research Center at Cornerstone: A Collection of Scholarly and Creative Works for Minnesota State University, Mankato. It has been accepted for inclusion in Undergraduate Research Symposium by an authorized administrator of Cornerstone: A Collection of Scholarly and Creative Works for Minnesota State University, Mankato.



# MINNESOTA STATE UNIVERSITY

M A N K A T O



## 2010 UNDERGRADUATE RESEARCH CONFERENCE

April 5 & 6, 2010



## **WELCOME**

Welcome to the 12<sup>th</sup> annual Undergraduate Research Conference at Minnesota State University, Mankato. This conference provides an exciting opportunity for the University to showcase the research and creative activity of our undergraduate students. These projects, submitted by 193 students representing six colleges, are the result of collaboration between talented and motivated undergraduate students and their dedicated faculty mentors. This year there will be a total of 143 presentations affording a wide array of on-going, outstanding scholarly and creative activity on our campus. Abstracts of these oral, performance, or visual arts projects and posters accepted for presentation are contained in this formal publication. I applaud the work of these students and the 82 committed faculty members who served as mentors and encourage faculty, students, staff and guests to attend the formal presentations that will take place in the Centennial Student Union on April 5<sup>th</sup> and 6<sup>th</sup>, 2010. Our vision to be known as a university where people expect to go further than they thought possible is clearly demonstrated by these students and faculty. The entire University community celebrates the achievements of these outstanding undergraduate students and congratulates all participating students and their faculty mentors.

Richard Davenport  
President  
Minnesota State University, Mankato

## A WORD FROM THE URC OFFICE

First, we would like to welcome all presenters, mentors and attendees to the 2010 Undergraduate Research Conference. It is our pleasure and privilege to put forth what we see as a true celebration of the many forms of undergraduate scholarship. This conference began as a grassroots faculty movement to create an outlet for excellent student-mentor collaborations on campus. As the URC continues to diversify and evolve, the outstanding efforts of faculty mentors will be the one constant. URC student presenters are exceptional by definition of their presence here at what is perhaps the most visible example that MSU honors the strategic priority of enhancing academic excellence in undergraduate studies. They are those who choose to go above and beyond requirements and for that effort are able to access an enriched educational experience that can have profound impact on their time here at MSU and beyond.

Everything the URC oversees including the details of the conference events, the granting process, and the undergraduate journal would be impossible without the contributions of many beyond just this office. We are genuinely grateful for their donations of time and support.

Dawn N. Albertson  
Chair, URC Steering Committee

Ashley Brenke  
URC Graduate Assistant

### Undergraduate Research Conference Committee Members:

Laura Bartolo  
Barb Bergman  
Queen Booker  
Emily Boyd  
Kristie Campana  
Kathy Dale  
Lance Dalleck

Geoff Goellner  
Heather Hamilton  
Cindra Kamphoff  
Steven Losh  
Mark McCullough  
Alex Panahon  
Amanda Smith

## URC SPECIAL THANKS

Richard Davenport – President  
Scott Olson – Provost and Vice-President, Academic Affairs, Luncheon Keynote Speaker  
Anne Blackhurst – Dean, Graduate Studies and Research  
Annie LoPrieno– Director, Research and Sponsored Programs  
Kristel Lynch - Grants Specialist and Pre-Award Coordinator  
Jeane McGraw - Grants Specialist and Post-Award Coordinator  
Candace Hottinger – Administrative Assistant, Research and Sponsored Programs  
Douglas Mayo – Vice President, University Advancement  
Margot Zelenz – Associate Vice President, University Advancement  
Tracey Hammell – MSU Site Coordinator, NorthStar STEM Alliance  
Moderators and Judges

We would like to add a special thank you to the Minnesota State University, Mankato Foundation Board for five years of generous support of excellent undergraduate research, scholarship and creative practice.



MINNESOTA STATE UNIVERSITY MANKATO  
FOUNDATION



## FUNDING SOURCES FOR RESEARCH PROJECTS AT THE 2010 URC

Several of the research and creative projects presented at this year's Minnesota State University, Mankato Undergraduate Research Conference were awarded funding through a competitive grant review process. Funding sources include the generous contributions from two outside sources as well as monies allocated by the University. Awardees of these grants are noted with their abstract. The specific types of funding awards are outlined below.

### **Minnesota State University, Mankato Foundation Awards: up to \$2,000**

These awards are from the Minnesota State University, Mankato Foundation Board to support high quality student scholarship at the University. Each student recipient is given \$1000 as a stipend and up to \$1000 for the supplies necessary for the completion of their project.

### **NorthStar STEM Alliance Awards: up to \$2,000**

These awards are available to students from underrepresented ethnicities enrolled in specific science, technology, engineering and mathematics discipline majors. Each recipient was granted \$1000 in the form of a stipend and up to \$1000 in supplies. This funding was allocated as part of a larger, multi-campus National Science Foundation grant to encourage student research.

### **Undergraduate Research Conference Large Grant: up to \$1,000**

A large grant includes funding for both a student stipend of \$500 and up to \$500 in supplies to aid in the successful completion of their project. These grants are funded by the University.

### **Undergraduate Research Conference Small Grant: up to \$500**

A small grant includes funding for supplies to help aid in the completion of the proposed projects. These grants, like the large grants, are funded by the University.

## URC MEDALS AND PRESENTATION AWARDS

**Medals** - Each student who participates at the URC is awarded a medal in recognition of their scholarly achievement to be worn at the students' graduation ceremony. A solid green ribbon is in recognition of presentation at the URC while a green and gold ribbon highlights recipients of the Foundation Awards.

**Presentation Awards** - Each poster and oral presentation session is judged by two judges who are graduate students, faculty, or other qualified individuals involved on campus. The best presentation in each session will be recognized with a "Best Presenter" certificate announced at the URC Luncheon. Winners are also noted on the URC website.

*\*Abstracts were written by the project facilitator and reviewed by faculty mentors. Any opinions expressed do not represent those of the URC Steering Committee or Minnesota State University, Mankato.*

## Monday, April 5      Schedule of Events

7:30 – 3:00	Student Presenter, Moderator and Judge Check-in	CSU Ballroom Lobby
	Coffee and Snacks Available	CSU 202
8:00 – 4:00	Judges' Gathering Site	CSU 256
8:30 – 10:00	<b>Oral Session 1</b> Social Work and German	CSU 201
10:00 – 12:00	<b>Oral Session 2</b> Psychology	CSU 201
10:00 – 12:00	<b>Oral Session 3</b> Health, Athletic Training and Human Performance	CSU 284A
10:00 – 12:00	<b>Oral Session 4</b> Gender & Women's Studies	CSU 204
10:00 – 12:00	<b>Poster Session A</b> College of Science, Engineering & Technology	CSU 253/4/5
12:00 – 1:00	Lunch (on your own)	
1:00 – 3:00	<b>Oral Session 5</b> Automotive Engineering Technology	CSU 201
1:00 – 3:00	<b>Oral Session 6</b> Biological Sciences	CSU 284A
1:00 – 3:00	<b>Oral Session 7</b> English and History	CSU 204
1:00 – 3:00	<b>Poster Session B</b> Communication Disorders, Communication Studies, Community Health, Education, Family Consumer Science, Geography, Human Performance, Nursing, Psychology and Sociology & Corrections	CSU 253/4/5

Tuesday, April 6      Schedule of Events		
--	--	--

7:30 – 12:30	Presenter Check-in	CSU Ballroom Lobby
	Coffee and Snacks Available	CSU 202
8:00 – 12:30	Judges' Gathering Site	CSU 256
8:00 – 10:00	<b>Oral Session 8</b> Art, Art History and Music	CSU 201
8:30 – 10:30	<b>Poster Session C</b> Social Work	CSU 253/4/5
10:00 – 12:00	<b>Oral Session 9</b> Psychology	CSU 201
10:00 – 12:00	<b>Oral Session 10</b> Math, Computer Science, Electrical & Computer Engineering & Technology and Biological Sciences	CSU 284A
10:00 – 12:00	<b>Oral Session 11</b> Sociology & Corrections and Gender & Women's Studies	CSU 204
1:00 – 3:00	<b>URC Luncheon and Award Ceremony</b>	<b>Ballroom South/Center</b>



## Social Work and German

**IMR Deconstruction and Reconstruction: Mental Health Group Recovery**

Lauren Harding (Department of Social Work)

Renee Lips (Department of Social Work)

*Christine Black-Hughes, Faculty Mentor (Department of Social Work)*

\*Recipient of Minnesota State University, Mankato Foundation Grant

**Effects of Remote Alcohol Monitoring on Long-term Alcohol Use**

Whitney Zilles (Department of Social Work)

*David Beimers, Faculty Mentor (Department of Social Work)*

\*Recipient of Undergraduate Research Conference Large Grant

**The Limbo of Identity: Representations of Division in a Reunified Germany**

Daniel Schmitt (Department of Modern Languages/German)

*Nadja Krämer, Faculty Mentor (Department of Modern Languages/German)***Crossing borders: Fatih Akin's Transnational Purpose**

Drew Nelson (Department of Modern Languages/German)

*Nadja Krämer, Faculty Mentor (Department of Modern Languages/German)*

## **IMR Deconstruction and Reconstruction: Mental Health Group Recovery**

Lauren Harding (Department of Social Work)

Renee Lips (Department of Social Work)

*Christine Black-Hughes, Faculty Mentor (Department of Social Work)*

\*Recipient of Minnesota State University, Mankato Foundation Grant

In recent years the recovery process of people with mental illness has been extensively researched. Program models such as Illness Management and Recovery (IMR) have been proven to be successful with a high degree of fidelity. The overall goal of this project is to design client and clinician manuals based on IMR that allow the modules to be implemented in groups. The ten IMR modules will be reconstructed into four 12-week group sessions for Transition Services (TS) at St. Peter Regional Treatment Center (SPRTC). It is expected the curriculum constructed will be implemented to provide TS with an evidence based curriculum. The student researchers will reconstruct ten IMR modules into a client and clinician manual that are written specifically for Transition Services (TS) at St. Peter Regional Treatment Center (SPRTC). The impact of TS utilizing the manuals will be the provision of an evidence based curriculum. It is expected the curriculum in the manuals will be implemented. Currently, the programming at SPRTC is not evidence based and the recovery rate of the clients is undetermined. By using and evaluating the reconstructed IMR modules the staff at SPRTC will be able to initially establish a baseline for client recovery which will be used for a comparison studies of client recovery rates in the future.

## **Effects of Remote Alcohol Monitoring on Long-term Alcohol Use**

Whitney Zilles (Department of Social Work)

*David Beimers, Faculty Mentor (Department of Social Work)*

\*Recipient of Undergraduate Research Conference Large Grant

Secure Continuous Remote Alcohol Monitor (SCRAM) ankle bracelets monitor offender alcohol consumption. Once an ankle bracelet is attached to an offender, SCRAM is able to track any alcohol usage. The device operates 24/7, testing transdermally for any alcohol introduced into the offender's system. This research study was a cross-sectional survey of individuals who were involved with Waseca County Court Services between July 2008 and December 2009. The study examined whether individuals on the SCRAM program changed their behavior towards alcohol consumption as a result of the use of remote electronic alcohol monitoring device. The primary method of research used was a generated survey. Surveys were printed on three different colors of paper to generate a generalized report based on a categorization of the offence that lead to a court order of participation in the SCRAM program. The categories of offender populations that were selected included: pre-trial conditional drunk driving, probation drunk driving, and other criminal offences. Offenders confidentially answered survey questions without providing any identifying information. Results of the survey were then analyzed.

## **The Limbo of Identity: Representations of Division in a Reunified Germany**

Daniel Schmitt (Department of German)

*Nadja Krämer, Faculty Mentor (Department of Modern Languages/German)*

This project examined various texts which represent division and lost East-German identity in the years following the collapse of the Berlin wall and the eventual reunification of Germany. Because national and personal identity was often in direct correlation with the former GDR regime and the communist ideals it upheld, once the GDR faded away into the history books, GDR identity became traumatized; many former citizens were not ready to be successful functioning members of the new capitalist state they now found themselves in. This identity- conflict ultimately raises the question: is it possible for Germany to ever be truly united if such division exists among its populace? The project also focuses on how space, and the transformation of that space, can traumatize identity. Spaces that will be examined include public urban landscapes and spaces in the private sphere of life. Finally, the project examines the suggestions these texts make when it comes to addressing lost identity and overcoming such a daunting challenge as reconfiguring oneself in an entirely different cultural/political landscape.

## **Crossing borders: Fatih Akin's Transnational Purpose**

Drew Nelson (Department of Modern Languages/German)

*Nadja Krämer, Faculty Mentor (Department of Modern Languages/German)*

To be, is to be mobile. At least, that's what Turkish-German director Fatih Akin would like the world to see. His acclaimed films have nursed a genre of its own – transnational cinema – which imagines our society's desire to freely cross cultural, national and traditional borders of self-identification, then wrenches it away. The implication of this perspective is that the status quo isn't there yet, giving rise to intolerance and tragedy in Akin's contemporary society. Regardless of how developed our nations are and how intelligent the human race is, we can't overcome our differences until we overcome ourselves. This article analyzes the thoughts and feelings of generations, particularly in Akin's "home" nations, as the paradigm constantly shifts and evolves, seeking to make the director's transnational imagination of hope and humanity a reality. Most importantly though, this article attempts to connect Akin to a simple notion: who, what and where we call home need never be limited.



## Psychology

### **Assessing Activation in Memory for Positive and Negative Stereotypes**

Amber Scheierl (Department of Psychology)

*Karla Lassonde, Faculty Mentor (Department of Psychology)*

### **Trust and Social Networking Behaviors in Virtual and Face-to-Face Teams**

Lauren Stelten (Department of Psychology)

*Andrea Lassiter, Faculty Mentor (Department of Psychology)*

### **Race and Religion Relating to Helping Behaviors**

Sahra Ahmed Ali (Department of Psychology)

*Kristie Campana, Faculty Mentor (Department of Psychology)*

### **Parenting Styles: Does Society Judge Men More Harshly than Women for the Same Parenting Mistakes?**

Kimberly Woodgate (Department of Psychology)

*Kristie Campana, Faculty Mentor (Department of Psychology)*

### **Wellness Behaviors of College Students: Connecting Implicit and Explicit Measures**

Jessica M. Morales (Department of Psychology)

*Karla A. Lassonde, Faculty Mentor (Department of Psychology)*

### **The Use of a Paper and Pencil Analogue Task to Measure Ageism**

Cassie Nieman (Department of Psychology)

*Jeffrey Buchanan, Faculty Mentor (Department of Psychology)*

### **More than a guy thing? Going beyond gender to investigate the influence of sex roles on alcohol attitudes and consumption.**

Naomi Timm (Department of Psychology)

*Dawn N. Albertson, Faculty Mentor (Department of Psychology)*

\*Recipient of Minnesota State University, Mankato Foundation Grant

### **Examining the influence of framing and personality traits on motivating study habits in college students**

Amanda Vonbergen (Department of Psychology)

*Emily Stark, Faculty Mentor (Department of Psychology)*

## **Assessing Activation in Memory for Positive and Negative Stereotypes**

Amber Scheierl (Department of Psychology)

*Karla Lassonde, Faculty Mentor (Department of Psychology)*

Stereotypical knowledge is typically thought to represent negative characteristics of a group. However, researchers have identified that stereotypes can be both positive and negative (e.g., Maratos, 2001; Shih, Pittinsky, & Ambady, 1999). Studies have shown that negative stereotypes, compared to positive stereotypes, can evoke levels of bias and emotion (e.g., Maratos, 2001). As a result, the processing and embeddedness of positive and negative stereotypical knowledge in memory may differ. In the current study a reading task, which has been validated to measure activation of stereotypical knowledge (Lassonde, 2008), was used to determine whether or not stereotype activation differs as a function of valence.

Fifty undergraduate psychology students at Minnesota State University read a series of 24 passages. The passages contained information about a character which was intended to activate either a positive or negative stereotype. This context was followed by a target sentence in which information was consistent with either the positive or negative stereotype, inconsistent with either the positive or negative stereotype, or neutral. The time it took participants to read target sentences was recorded.

Faster reading times for target sentences containing information consistent with activated stereotypes, for both positive and negative characteristics, compared to reading times on target sentences that are either neutral or inconsistent would demonstrate that positive and negative stereotypes are equally accessible in memory. Differences in reading times on target sentences containing positive and negative stereotypes (e.g., reading times are either faster or slower) may indicate that stereotype accessibility differs as a function of valence.

## **Trust and Social Networking Behaviors in Virtual and Face-to-Face Teams**

Lauren Stelten (Department of Psychology)

*Andrea Lassiter, Faculty Mentor (Department of Psychology)*

Today organizations use a variety of types of teams to accomplish more work than individuals can alone. Work teams may vary in the extent to which they rely on virtual work. More specially, some team members are geographically dispersed and never see each other face-to-face, while others work in the same office space. Researchers have recently been examining the role of trust and its influence on team effectiveness. However, little empirical research has focused on the role that social networking plays in virtual team effectiveness. Because individuals are using social networking tools more in both work and non-work aspects of their lives, we examined what role it plays in helping virtual teams be more effective. Given what is known about virtual teams and social networking, it was hypothesized that those individuals who are more involved with social networking (i.e., Facebook, LinkedIn, etc) will feel more comfortable and be more effective at working in virtual teams. As the level of comfort in electronic environments increases, their trust level of virtual team members should also increase. Results of this study will add to what is known about social networking and virtual team effectiveness.

## **Race and Religion Relating to Helping Behaviors**

Sahra Ahmed Ali (Department of Psychology)

*Kristie Campana, Faculty Mentor (Department of Psychology)*

Racial attributes have been explored in different ways, such as differences in pro-social behaviors demonstrated toward white Americans compared to black Americans (Crosby, Bromley & Saxe, 1980). Previous research suggests that white racism is a centuries-old system which was designed to oppress blacks and other people of color and also to exclude them from participating in the society; however, this process may function at an unconscious level (Feagin, Vera, & Batur, 2001). At this time, research has not explored how race might interact with religion in prosocial behaviors. Given previous research, it is possible that an indication of a minority religion (e.g. a head scarf) may affect how both black and white people are helped by others. In the current study we hypothesized that individuals are more likely to help a white person compared to a black person. Likewise, we expect individuals are more likely to help a person who was not wearing a headscarf versus someone who was wearing a headscarf. Results are pending. The findings of this study will have a number of practical implications in terms of how race and religion influence prosocial behaviors.

*Keywords: Stereotype, race, religion and helping*

## **Parenting Styles: Does Society Judge Men More Harshly than Women for the Same Parenting Mistakes?**

Kimberly Woodgate (Department of Psychology)

*Kristie Campana, Faculty Mentor (Department of Psychology)*

Our research study sought to determine if there are significant differences in the way society views and subsequently judges mothers versus fathers for making the same parenting mistakes. Previous research indicates that gender stereotypes held by participants may prompt them to see women as the primary caretaker of children, and thus better suited to care for a child and make good decisions (Moon & Hoffman, 2008; Bernett et al., 2008). Unfortunately, this may also lead to men being judged more harshly for making mistakes with children. Hence, our hypothesis was that men are judged more harshly than women are for making the same mistakes. In addition, we hypothesized that women will judge the mistakes more harshly overall. To test our hypotheses, 120 participants read several vignettes in which a parent committed a parenting mistake. We created two different versions of the survey in which we alternated the names (Joe/Jessica) and identifying pronouns (he/she) in the vignettes from male parents to female parents. Each survey contained a mix of male and female parents. After reading each vignette, participants were asked to rate the parent's behavior on a scale of one to five, one being acceptable and five being unacceptable. Research results are pending. The findings of this study may suggest ways in which stereotypes about men and women affect reactions to their behavior; significant results may have important implications regarding how gender may affect court cases involving children.



## **Wellness Behaviors of College Students: Connecting Implicit and Explicit Measures**

Jessica M. Morales (Department of Psychology)

*Karla A. Lassonde, Faculty Mentor (Department of Psychology)*

College students engage in risky and unhealthy behaviors more often than the general population and it is important to know why. This project examined whether the implicit beliefs of college students regarding health were related to their wellness behaviors. Participants were asked to complete an implicit measure called the Implicit Association Test (IAT) which measures associations in memory between positive and negative concepts. Participants also completed an explicit task called the Holistic Lifestyle Questionnaire (HLQ) which is a survey that measures wellness behaviors, providing an overall score of wellness for each participant. During the IAT participants saw words associated with good health such as exercise and water paired with pleasant words such as paradise and happy or words associated with poor health such as tanning and stress paired with negative words such as evil and hurt. Response times to the word pairs were recorded. Facilitated response times for word pairs (e.g., tanning-evil or exercise-happy) would indicate these words are associated in memory. We assessed the relation between responses on the IAT and HLQ. Specifically, we wanted to assess whether or not “healthy” participants, as determined by their HLQ scores, would respond more slowly when a healthy word (exercise) was paired with an unpleasant word (terrible) indicating that the two concepts are not associated in memory. We also examined if the opposite effect would occur. If participants are slower to associate healthy words with positive associations (exercise-happy), this result may indicate positive associations with unhealthy behaviors.

## **The Use of a Paper and Pencil Analogue Task to Measure Ageism**

Cassie Nieman (Department of Psychology)

*Jeffrey Buchanan, Faculty Mentor (Department of Psychology)*

Ageism is defined as “any prejudice or discrimination against or in favor of an age group.” As early as 1944, scales of ageism were developed to assess attitudes toward the elderly. Since then, multiple scales were developed, each attempting to create better methods to assess ageism. The present study will utilize an online survey from approximately 200 students from Minnesota State University, Mankato. The purpose of this study was to measure college students’ attitudes toward older adults using an established measure (i.e., the Aging Semantic Differential; ASD), and compare it with an analogue measure developed by the researcher. The analogue task depicted a specific real-life situation where an individual was directly in contact with an older individual. It is hypothesized that scores on the ASD and the analogue measure will be significantly positively correlated.

## **More than a guy thing? Going beyond gender to investigate the influence of sex roles on alcohol attitudes and consumption.**

Naomi Timm (Department of Psychology)

*Dawn N. Albertson, Faculty Mentor (Department of Psychology)*

\*Recipient of Minnesota State University, Mankato Foundation Grant

Historically, heavy drinking was seen as a masculine activity and bars were viewed as a man's territory (Montemurro and McClure, 2005), but societal views are changing. In fact, women are starting to catch up to men in their prevalence of binge drinking (Veal and Ross, 2006). The remaining alcohol consumption gap between men and women could reflect the embedded social roles assigned to each gender (Wilsnack, Vogeltanz, Wilsnack & Harris, 2000). Sandra Bem proposes that males and females may demonstrate various sex roles regardless of their actual gender. In addition to the traditional *masculine* and *feminine* traits, Bem offers the idea of *androgyny*, having characteristic of both masculinity and femininity, and *undifferentiated*, having neither masculine nor feminine characteristics (Bem, 1974). This project investigated the connection between sex type roles (masculine, feminine, androgynous, and undifferentiated) and alcohol attitudes and consumption among college students. Two hundred and fifty participants completed three surveys. The first, a short form of the Bem Sex Role Inventory (BSRI), assessed an individual's stereotypical sex role characteristics. The second survey asked the participant to indicate their overall thoughts, attitudes, and feelings towards drinking alcohol (Simons and Carey, 1998). The third required participants to report their previous and current levels of alcohol consumption. It was hypothesized that people displaying classically masculine traits will report higher levels of consumption and more positive attitudes towards alcohol than those showing traditionally feminine traits.

## **Examining the influence of framing and personality traits on motivating study habits in college students**

Amanda Vonbergen (Department of Psychology)

*Emily Stark, Faculty Mentor (Department of Psychology)*

Many people have researched study habits of college students, mainly focusing on what studying techniques are used and which are most effective. A study by Balduf (2009) found that, time management and motivation become a key issue associated with studying. When there is a lack of motivation, there is a lack of studying, which in turn decreases test performance.

Stark (2009) found that students with low test anxiety rated a gain-framed message about studying as more motivating, whereas students with higher test anxiety, rate a loss-framed message as more motivating. The current study expands this by bringing it into the classroom, getting direct feedback as students are in the process of studying and taking exams. Questionnaires were administered before and after participants were given their first exam of the semester. Replications of the previous findings were administered as well as assessments of the factors involved in students' motivations to study. It was hypothesized that students who report greater test anxiety will be more motivated by the loss-framed statement, whereas those who report less test anxiety will be more motivated by the gain-framed statement.

## Health, Athletic Training and Human Performance

### **The Effect of Training with Nintendo Wii Fit Balance Programs on Measures of Balance in Older Women**

Vashti R. DeRosier (Department of Human Performance)

Molly J. Hyland (Department of Human Performance)

*Mary Visser, Faculty Mentor (Department of Human Performance)*

\*Recipient of Minnesota State University, Mankato Foundation Grant

### **Media Images of Elite Athletes: Perceptions of Male Athletes**

Alicia J. Johnson (Department of Human Performance)

*Cindra Kamphoff, Faculty Mentor (Department of Human Performance)*

*Suzannah Armentrout, Faculty Mentor (Department of Human Performance)*

\*Recipient of Undergraduate Research Conference Large Grant

### **Obesity Among Latino Adolescents: The Role of Acculturation**

Paulina Manzo (Department of Health Science)

*Judith Luebke, Faculty Mentor (Department of Health Science)*

### **Gender Representation on the Cover of *ESPN the Magazine*, 1998-Present**

Inge E. Milius (Department of Human Performance)

*Cindra Kamphoff, Faculty Mentor (Department of Human Performance)*

*Suzannah Armentrout, Faculty Mentor (Department of Human Performance)*

### **Burner and Stingers (Management and Prevention)**

Anthony Hunter (Department of Athletic Training)

*Theresa Mackey, Faculty Mentor (Department of Human Performance)*

*Jeff Chambers, Faculty Mentor (Department of Athletic Training)*



## **The Effect of Training with Nintendo Wii Fit Balance Programs on Measures of Balance in Older Women**

Vashti R. DeRosier (Department of Human Performance)

Molly J. Hyland (Department of Human Performance)

*Mary Visser, Faculty Mentor (Department of Human Performance)*

\*Recipient of Minnesota State University, Mankato Foundation Grant

Researchers have estimated that more than 1/3 of older adults 65 and older fall each year in the U.S. In 2005, 15,800 people 65 years and older died from injuries related to unintentional falls and 1.8 million were treated in emergency departments for nonfatal injuries (CDC, 2007). Exercise programs have been demonstrated to improve balance and reduce the risk of balance-related falls. Recent guidelines have suggested that all older adults participate in balance and mobility training (Nelson et al., 2007). The Nintendo Wii Fit (NWF) has attracted interest as a possible activity option. An important question is whether NWF activities could also improve balance and mobility. The purpose of this study was to determine the acute and chronic effects of regular training with selected components of the NWF Balance Programs on measures of balance and mobility in older women. Ten women between 55 and 79 years of age volunteered for the study. Each trained twice a week for 8 weeks, each session lasting approximately 30 minutes. Baseline measures were taken at the beginning of the program and repeated every 4 weeks for a total of 5 assessments during and after training. These included the Berg Balance Scale, the Timed Up and Go Test, the Functional Reach Test, the Four Square Step Test, and the Activity-Specific Balance Confidence Scale. It is anticipated that significant changes in balance measures will be observed when the training period is complete and data have been analyzed.

## **Media Images of Elite Athletes: Perceptions of Male Athletes**

Alicia J. Johnson (Department of Human Performance)

*Cindra Kamphoff, Faculty Mentor (Department of Human Performance)*

*Suzannah Armentrout, Faculty Mentor (Department of Human Performance)*

\*Recipient of Undergraduate Research Conference Large Grant

Historically media representations of female athletes emphasize physical attractiveness and heterosexuality while representations of male athletes highlight athletic strength and competence (Daddario, 1997; Kane & Lenskyj, 1998). This trend may be changing as a recent edition of *ESPN The Magazine*, in which over 80% of the readership are men (Gibson, 2009), displayed both female and male athletes posing semi-nude or nude. This issue of *ESPN The Magazine* was titled “The Body Issue” and included six different covers and approximately thirty photographs of male and female elite athletes. In this issue, both females and males are shown in various degrees of nudity but the females were mostly photographed with the full length of their bodies showing while the men were typically displayed from the waist up. A few studies have examined female perceptions of female athletes posing nude (Johnson, Kamphoff, Armentrout, In Progress) but no studies to date have specifically focused on the male athletes’ perspectives of how the media portrays female and male elite athletes that are posing nude or semi-nude. Therefore, the purpose of this study was to better understand male college athletes’ perceptions of media images of female and male elite athletes. Twelve current college male athletes from the swimming, football, and basketball teams were interviewed in order to better understand male college athletes’ perceptions of media images of female and male elite athletes within “The Body Issue.” Full interview results will be provided.

## **Obesity Among Latino Adolescents: The Role of Acculturation**

Paulina Manzo (Department of Health Science)

*Judith Luebke, Faculty Mentor (Department of Health Science)*

Statistical data have shown that young Latinos have the highest rates of obesity among all ethnic groups. Obesity in the general population is a major health concern in the United States, but it is believed that acculturation plays an important factor in Latino adolescents. Acculturation is a process in which a person adapts to a new culture or environment. Research indicates that often, during acculturation healthy behaviors decline, leading to behaviors that result in a higher risk of obesity. This research study investigated cultural, social, and behavioral factors that can affect Latino adolescents' eating and health practices, which in turn influence obesity rates. Data about Latino parents' eating practices and food choices in the context of acculturation were also collected in this study. By including both Latino adolescents and parents as subjects, a broader understanding of the impact of acculturation upon food choice and eating behaviors with the family and across generations was achieved. The methods for this study were both qualitative and quantitative. Focus groups were conducted and surveys were distributed to subjects at the high school, community learning centers and churches in Worthington Minnesota, a rural community with a large population of Latino residents. By learning more about the factors that affect obesity through the acculturation process; it is hoped that we can implement effective health education programs in our communities that will help lower the rates of obesity.

## **Gender Representation on the Cover of *ESPN the Magazine*, 1998-Present**

Inge E. Milius (Department of Human Performance)

*Cindra Kamphoff, Faculty Mentor (Department of Human Performance)*

*Suzannah Armentrout, Faculty Mentor (Department of Human Performance)*

Female athletes are considerably underrepresented in sport media and are only featured approximately 6-8% of the time (Fink & Kensicki, 2002; Kane, 1996; Kane & LaVoi, 2001). Kane and Buysse (2005) found that when the female athletes are featured in media, they are portrayed differently than male athletes. Femininity and attractiveness are typically emphasized when the media features female athletes (Kane & Buysse, 2005). Moreover, females tend to be shown in more gender appropriate sports that are individual in nature (i.e. tennis) and are more likely to be shown off the court, out of uniform and in sexualized poses (Kane & Buysse, 2005). The purpose of this study was to examine the covers of *ESPN the Magazine* for gender representation. A content analysis was conducted on the photographic images contained in 13 years (369 issues) of *ESPN the Magazine* from 1998 to February 2010. All covers were analyzed to determine gender representation, clothing coverage, type of sport, and action or posed representation. Codes were determined based on previous research (Armentrout & Kamphoff, under review). The content analysis revealed that females were substantially underrepresented on the covers of *ESPN the Magazine*. In fact, males outnumbered females 14-to-1. When females were featured (7%), the majority were depicted wearing tighter and less clothing, in feminine appropriate individual sports, and photographs that were posed. Since the magazine started, only 13 different female athletes have appeared on the cover. The presentation will expand on these findings and discuss the importance of more representative media coverage.

## **Burner and Stingers (Management and Prevention)**

Anthony Hunter (Department of Athletic Training)

*Theresa Mackey, Faculty Mentor (Department of Human Performance)*

*Jeff Chambers, Faculty Mentor (Department of Athletic Training)*

In collision sports the brachial plexus injury is a common issue dealt with by athletic trainers. The intense sensation of a burning or stinging feeling radiating down the arm is often described in laymen's term as a "Burner or Stinger." Preventing the burner/stinger has been a constant struggle for many athletic trainers. Recommendations for preventing burners/stinger are documented in the literature. Some common ways for preventing this type of injury include; increase flexibility, strengthen the neck musculature, ensure coaches teach proper blocking and tackling techniques, and ensure the athletes wear appropriate protective equipment. Even though protective equipment prevents hyperextension of the cervical spine, it does not limit or prevent lateral flexion or the combination of extension, lateral flexion, and rotation of the cervical spine which are more common mechanisms of injury for the burner/stinger. In addition to treating and preventing the burner/stinger, the issue of athletes not reporting this injury to athletic trainers has made it very difficult to manage. Chronic issues can result from the athlete not reporting a burner/stinger and increases recurrence of the injury. There needs to be further research done, to determine better methods to prevent recurrence of this injury, and also to address the issue of the injury being underreporting by athletes.

## Gender & Women's Studies

### **Feminism and Motherhood: Negotiating the Divide**

Katherine England (Department of Sociology)

*Luis Posas, Faculty Mentor (Department of Sociology)*

*Helen Crump, Faculty Mentor (Department of Gender & Women's Studies)*

### **The Devaluing of Nurses in Healthcare: Media Portrayals and Their Effect on the Public's Opinion on Nurses**

David Domask (Department of Gender & Women's Studies)

*Helen Crump, Faculty Mentor (Department of Gender & Women's Studies)*

### **Rules of Dating and Dating Etiquette**

Dawn Helgeson (Department of Gender & Women's Studies)

*Helen Crump, Faculty Mentor (Department of Gender & Women's Studies)*

### **"AIDS is left in Africa: HIV/AIDS Behavioral Risk factors among Ethiopian and Eritrean Refugees living in Minnesota"**

Betlehem A. Semahge (Department of Gender & Women's Studies)

*Jackie Viecei, Faculty Mentor (Department of Political Science)*

*Helen Crump, Faculty Mentor (Department of Gender & Women's Studies)*

### **Messages to Girls About Dating Relationships in The Twilight Saga**

Kari Jansen (Department of Gender & Women's Studies)

*Helen Crump, Faculty Mentor (Department of Gender & Women's Studies)*

*Melissa Purdue, Faculty Mentor (Department of English)*

### **Hip-Hop Feminism: A Look at Women, Words and Wisdom in Hip-Hop**

Angela Proehl (Department of Gender & Women's Studies)

*Helen Crump, Faculty Mentor (Department of Gender & Women's Studies)*

### **Women Athletes and the Media: A Look at Unequal Coverage, Social Stereotypes, and Issues Facing Women Athletes**

Ashley Krohn (Department of Gender & Women's Studies/Mass Communications Public Relations)

*Helen Crump, Faculty Mentor (Department of Gender & Women's Studies)*

*Amy Lauters, Faculty Mentor (Department of Mass Communications)*

### **It's None of Your Business: Rural Domestic Violence in the Upper Midwest**

Anna-Kjersten Fors (Department of Gender & Women's Studies)

*Maria Bevacqua, Faculty Mentor (Department of Gender & Women's Studies)*

*Helen Crump, Faculty Mentor (Department of Gender & Women's Studies)*

## **Feminism and Motherhood: Negotiating the Divide**

Katherine England (Department of Sociology)

*Luis Posas, Faculty Mentor (Department of Sociology)*

*Helen Crump, Faculty Mentor (Department of Gender & Women's Studies)*

Women, especially feminists, are conflicted about leaving their careers for motherhood; some wonder if they can even be a feminist and a mother at the same time. This feminist research explores how women negotiate the divide between feminism and motherhood. This paper explores feminist texts such as books, peer reviewed journals and studies. It was found that there is often a conflict of interest within the subjects of work, mothering, gender roles, relationships with partners, as well as other topics. Women often feel that they lose part of themselves or part of their identities when they choose to have children. To begin closing this divide, women need to examine intersections of social roles, gender roles, mothering, and feminist theory and how they let these affect their lives.

## **The Devaluing of Nurses in Healthcare: Media Portrayals and Their Effect on the Public's Opinion on Nurses**

David Domask (Department of Gender & Women's Studies)

*Helen Crump, Faculty Mentor (Department of Gender & Women's Studies)*

As healthcare related issues continue to rise, an unexplored problem persists beyond the scope of current debate; fueled by ignorance and mainstream media portrayals, nurses worldwide are undervalued for their work, resulting in unrealistic hiring and education expectations. These expectations result in a shortage of some of the most valuable workers in the healthcare industry and leaves everyone at risk. Yet, the public is lax to any call to action because of a misrepresentation of nurses in mainstream media. This study focused on media portrayals of nurses, following a qualitative analysis of several popular medical based television shows from the late 1980's to 2010. From the research, a model for the mainstream nurse appears; female doctor's assistant. Useful for menial labor, but not for important medical emergencies. By juxtaposing this model against a typical nursing workload, the discrepancy between television fiction and reality becomes clear. This research demonstrated how the inconsistencies between the public understanding of the role of nurses and the actual work performed by nurses has created a system in which nurses are undervalued and underutilized, imposing an artificial shortage within the healthcare industry.

## **Rules of Dating and Dating Etiquette**

Dawn Helgeson (Department of Gender & Women's Studies)

*Helen Crump, Faculty Mentor (Department of Gender & Women's Studies)*

The topic of this research project was to investigate the impact of society's "Rules of Dating" on males and females. The main research objective of this project was to examine how certain Dating Rules and Dating Etiquette applies to people based on whether or not they are male or female. The research that is gained from this project will benefit the community and others by showing that there are different rules for men and women while dating. Through the research that was done with this project the main methodology was content analysis. The main findings of this research project were surprising and also quite fascinating. In conclusion, this research project showed the various rules for dating, what was expected out of men and women while on a date and while dating, and also the proper way to act while dating someone.

## **"AIDS is left in Africa: HIV/AIDS Behavioral Risk factors among Ethiopian and Eritrean Refugees living in Minnesota"**

Betlehem A. Semahge (Department of Gender & Women's Studies)

*Jackie Vieceli, Faculty Mentor (Department of Political Science)*

*Helen Crump, Faculty Mentor (Department of Gender & Women's Studies)*

In the United States certain standards are in place to cater to the needs of the average individual. However, HIV/AIDS prevention and care needs of culturally diverse populations, particularly in African immigrant communities, have not been up to those standards. The numerical gap of infection that exists between Ethiopian and Eritrean refugees and other groups is further widened by social and cultural specific factors; some unique while others are highly prevalent in these communities in comparison to others. This feminist based research examined the factors that impede understanding of the gravity of HIV/AIDS transmission and investigated available methods of spreading awareness and prevention education. Social and contextual influences on HIV were considered and risk vulnerability in these groups was discussed with an emphasis on individual perspectives of gender roles conducted through in-depth interviews and surveys. The study found that these communities disregard the seriousness of the HIV epidemic and have a false sense of belief that AIDS has been left behind in Africa. The lack of information, self-empowerment and control in sexual relationships also puts women at a greater risk for contracting the disease. Empowering women and extending the care needs of the communities through education is imperative if the gap is to be bridged and infection rates reduced.

## **Messages to Girls About Dating Relationships in The Twilight Saga**

Kari Jansen (Department of Gender & Women's Studies)

Helen Crump, Faculty Mentor (Department of Gender & Women's Studies)

Melissa Purdue, Faculty Mentor (Department of English)

Stephanie Meyer's *Twilight* Saga became a cultural hit. *Breaking Dawn* the final book in the *Twilight* Saga sold 1.3 million copies within the first 24 hours alone. The saga is centered around a relationship between the main character, Bella, and her relationship with a vampire named Edward and a werewolf, Jacob. With so many young girls having read this, there was a need to explore the messages about dating these books send to young girls who have read them. Using literary analysis, I examined the relationship between Bella, Edward and Jacob and compared it to current narratives and scholarship about dating violence. Some messages sent to young readers have an eerie resemblance to dating and partner violence. Hopefully this research has exposed messages that might be harmful to young girls, thus raising awareness in many ways. Young girls need to be aware of underlying messages they are reading in any book or are getting from any media outlet. Also I would like to spark awareness with authors that they would be more aware and more responsible with the messages they send to their audiences.

## **Hip-Hop Feminism: A Look at Women, Words and Wisdom in Hip-Hop**

Angela Proehl (Department of Gender & Women's Studies)

Helen Crump, Faculty Mentor (Department of Gender & Women's Studies)

This study analyzed the culture of women and feminism in hip-hop with emphasis placed on independent and Minnesota-based artists. This work engages an examination of individual personalities of women, such as Dessa (spoken word and rap artist) and Dr. Rachel Raimist (filmmaker and scholar), through a variety of resources including videos, interviews, articles, and music. Using *Home Girls Make Some Noise* as a grounding text for establishing the link between hip-hop, women, and feminism, I engaged content analysis to examine specific artists' works and personas as reflecting a feminist ideology, which I perceive as challenging or speaking back to mainstream, stereotypical representations of women in hip-hop. Consequently, these women's works suggest the need for feminists to continue to expand our ideas about where and how feminism takes place.



## **Women Athletes and the Media: A Look at Unequal Coverage, Social Stereotypes, and Issues Facing Women Athletes**

Ashley Krohn (Department of Gender & Women's Studies/Mass Communications Public Relations)

*Helen Crump, Faculty Mentor (Department of Gender & Women's Studies)*

*Amy Lauters, Faculty Mentor (Department of Mass Communications)*

This work took an in depth look at the media's representations of men and women athletes. The main problem associated with the media's representation of athletes is the idea that the media provides minimal portrayals of women athletes, often positioning them as sexual objects through poses, pictures and advertisements. Another problem uncovered within this work was that the amount of actual sports coverage given to female athletes and sports teams was significantly less than that of their male counterparts. Thus, using a Content Analysis of magazine and newspaper articles, it was found that while the actual amount of coverage women athletes and teams received was less than males, advertisements for both genders can be seen as highly sexualized, and the poses that women athletes portray often result in feelings of domination or vulnerability. In conclusion, women athletes and sports teams do not receive as much coverage of their actual sporting events, while the media portrayal of both male and female athletes are often sexualized, the female poses are more demeaning than those of their male counterparts found in the media recently.

## **It's None of Your Business: Rural Domestic Violence in the Upper Midwest**

Anna-Kjersten Fors (Department of Gender & Women's Studies)

*Maria Bevacqua, Faculty Mentor (Department of Gender & Women's Studies)*

*Helen Crump, Faculty Mentor (Department of Gender & Women's Studies)*

Rural domestic violence has received little attention in the media, by authorities, or from the general public. Shelters for women in rural areas have been hidden, partially for the protection of the women who need the services, but also to keep the issue itself hidden. As a result, domestic violence in rural communities often has been downplayed and made "invisible." Rural societies tend to emulate individualism, which means family problems are not meant to be addressed publicly. Individualism results in community consensus not to get involved in a family's private matters. This research project focuses on the rural upper Midwest, presents trends in rural domestic violence in the region, utilizes state statistics, newspaper accounts, academic research and journals, family oral history, and personal experiences. The work supports the contention that rural domestic violence is ignored, to the detriment of the victims and the community as a whole. Increased awareness will bring changes in addressing the topic. This project shows the need for doing more to raise awareness and the need to provide adequate support systems for rural domestic violence victims.

College of Science, Engineering & Technology

**1 - Effect of Temperature on Polyglutamine Tract Mutation Rate in Bacteria**

Han Lee (Department of Biological Sciences)

*Geoffrey M. Goellner, Faculty Mentor (Department of Biological Sciences)*

\*Recipient of Undergraduate Research Conference Small Grant

**2 - The effect of renal perfusion pressure on the baroreflex response to high blood pressure**

Dwight Hanson (Department of Biological Sciences)

Meredith Lovaas (Department of Biological Sciences)

*Penny Knoblich, Faculty Mentor (Department of Biological Sciences)*

\*Recipient of Undergraduate Research Conference Small Grant

**3 - Examination of cardiovascular development in the offspring of maternal SHR rats with impaired aldosterone secretion during pregnancy, using a remote monitoring system.**

Susan Gerbensky (Department of Biological Sciences)

Crystal Taylor (Department of Biological Sciences)

*Penny Knoblich, Faculty Mentor (Department of Biological Sciences)*

\*Recipient of Undergraduate Research Conference Large Grant

**4 - Expression of Lipoxygenase Isoforms in Wounded Pea Leaves**

Ifedi Obidiegwu (Department of Chemistry & Geology)

*Terry Salerno, Faculty Mentor (Department of Chemistry & Geology)*

\*Recipient of NorthStar STEM Alliance Award

**5 - Waste Water Treatment Evaluation for Effect of Antibiotics on Septic Systems**

Carl J. Sorensen (Department of Civil Engineering)

Jacob D. Moser (Department of Civil Engineering)

Mark Origer (Department of Civil Engineering)

Adam Nix (Department of Civil Engineering)

*Stephen J. Druschel, Faculty Mentor (Department of Civil Engineering)*

\*Recipient of Minnesota State University, Mankato Foundation Grant

**6 - Determination of ABO Variants Using ASP/ SSCP Analysis**

Jessica German (Department of Chemistry & Geology)

*Theresa Salerno, Faculty Mentor (Department of Chemistry & Geology)*

\*Recipient of Undergraduate Research Conference Large Grant

**7 - Effect of Lowered Aldosterone Levels on the Expression of the GR, MR, NHE-1, and NHE-3 in Rat Tissues**

Ami Kim (Department of Chemistry & Geology)

*Theresa Salerno, Faculty Mentor (Department of Chemistry & Geology)*

**8 - Simple Chemical Tests for Monitoring Home-Brewed Biodiesel Quality**

Sandra Tambi (Department of Chemistry & Geology)

James Thorne (Department of Chemistry & Geology)

*Daniel Swart (Department of Chemistry & Geology)*

**9 - Use of Q-PCR to Monitor Expression of Vegetative Lipxygenase in Soybeans**

Sarah Wageman (Department of Chemistry & Geology)

*James Rife, Faculty Mentor (Department of Chemistry & Geology)*

**10 - Investigation of the correlation between viability and optimal oxygen demand of dormant *Mycobacterium avium* subsp. *paratuberculosis***

Lauren Kinkead (Department of Biological Sciences)

*Timothy Secott, Faculty Mentor (Department of Biological Sciences)*

\*Recipient of Minnesota State University, Mankato Foundation Grant

**11 - Antimutagenic Role of Cinnamaldehyde and Vanillin with Guanosine**

Katelyn Taylor (Department of Chemistry & Geology)

*Danaé Quirk Dorr, Faculty Mentor (Department of Chemistry & Geology)*

**12 - From GFP to pFLAG: Confirmation of Intracellular Location of KIAA1946.**

Anita Becker (Department of Biological Sciences)

Jessica Appel (Department of Biological Sciences)

*Geoffrey Goellner, Faculty Mentor (Department of Biological Sciences)*

\*Recipient of Undergraduate Research Conference Large Grant

**13 - Flow Visualization Apparatus Restoration and Analysis**

Josh Braband (Department of Mechanical Engineering)

*Patrick Tebbe, Faculty Mentor (Department of Mechanical Engineering)*

**14 - Improvements to UHMWPE**

Brooke McKelvogue (Department of Mechanical Engineering)

*Patrick Tebbe, Faculty Mentor (Department of Mechanical Engineering)*

**15 - Purification and isolation of components of *Vernonia amygdalina* extracts demonstrating antioxidant activity and flavonoid content**

Cybill E. Okitikpi (Department of Biological Sciences)

*Danaé Quirk Dorr, Faculty Mentor (Department of Chemistry & Geology)*

\*Recipient of NorthStar STEM Alliance Award

**16 - Are Fall Leaves a Viable Feedstock for the Production of Cellulosic Ethanol?**

Nicholas A. Menne (Department of Biological Sciences)

*James E. Rife, Faculty Mentor (Department of Chemistry & Geology)*

**17 - Analysis of the CAG Trinucleotide Repeat in the Novel Polyglutamine Protein KIAA1946- Exclusion of this Genetic Locus as a Candidate Gene for Neurodegenerative Disease.**

Eric Miller (Department of Biological Sciences)

Travis Mrkvicka (Department of Biological Sciences)

*Geoffrey Goellner, Faculty Mentor (Department of Biological Sciences)*

\*Recipient of Minnesota State University, Mankato Foundation Grant

**18 - Investigation of cis- and trans- Chromium(III) Chloride Aquation**

Marjorie J. Ploeger (Department of Chemistry & Geology)

*Daniel J. Swart, Faculty Mentor (Department of Chemistry & Geology)*

**19 - Fluoroquinolone antibiotic complexes involving heavy metals, ciprofloxacin, and phenolic degradation products: Potential relevance in ground and waste water systems**

Indumini A. Weeramantri (Department of Chemistry & Geology)

Trista L. Ayers (Department of Chemistry & Geology)

Thomas G. Smith (Department of Chemistry & Geology)

*Trent P. Vorlicek, Faculty Mentor (Department of Chemistry & Geology)*

\*Recipient of Minnesota State University, Mankato Foundation Grant

**20 - Measuring Low Levels of  $^{14}\text{N}$  Using the  $^{14}\text{N}(\text{d},\text{n})^{15}\text{O}$  Reaction**

Christopher Prokop (Department of Physics & Astronomy)

John Clymer (Department of Electrical Engineering)

Nick Compton (Department of Physics & Astronomy)

Adam Hanson (Department of Physics & Astronomy)

Henry Dam (Department of Physics & Astronomy)

*Andrew D. Roberts, Faculty Mentor (Department of Physics & Astronomy)*

**21 - Effect of the group on individual choice in extreme geotaxis response in *Drosophila melanogaster***

Derek Schelling (Department of Biological Sciences)

Nicole Gilbert (Department of Biological Sciences)

Melissa Hanson (Department of Biological Sciences)

*Daniel P. Toma, Faculty Mentor (Department of Biological Sciences)*

\*Recipient of Minnesota State University, Mankato Foundation Grant

**22 - Thermoelectrics with Applications to Waste Heat Recovery, Heat Sources, and HVAC Systems**

Joseph Belgarde (Department of Mechanical Engineering)

*Patrick Tebbe, Faculty Member (Department of Mechanical Engineering)*

**23 - A Simple Circuit Model of a Flash Memory Cell**

Lindsay Stepan (Department of Electrical & Computer Engineering & Technology)

Hoon Lee (Department of Electrical & Computer Engineering & Technology)

*Tom Brown, Faculty Mentor (Department of Physics & Astronomy)*

*Brian Martensen, Faculty Mentor (Department of Mathematics & Statistics)*

**24 - Empirical Analysis of Costless Merge Pairing Heaps**

Joshua Vander Hook (Department of Computer Science)

*Dean Kelley, Faculty Mentor (Department of Computer Science)*

**25 - Factors Affecting the Expression of 9,13-Hydroperoxide Lyase in Cucumbers**

Ashok Singh KC (Department of Chemistry and Geology)

Samee M. Ranginwala (Department of Chemistry and Geology)

*James E. Rife, Faculty Mentor (Department of Chemistry and Geology)*

\*Recipient of Undergraduate Research Conference Small Grant

**26 - Development of a Multiplex DNA Typing Method**

Mohammad A. Ranginwala (Department of Chemistry and Geology)

*James Rife, Faculty Mentor (Department of Chemistry and Geology)*

## **27 - Parallel Implementation of SPARSKIT Using MPI on a Beowulf Cluster**

Joseph Dobmeier (Department of Mechanical Engineering, Department of Computer Science)

*Dean Kelley, Faculty Mentor (Department of Computer Science)*

*Steven Case, Faculty Mentor (Department of Computer Science)*

## **28 - Managing E. Coli Growth in Stormwater Catch Basins**

Eric Hanninen (Department of Civil Engineering)

Chandani Malla (Department of Civil Engineering)

Spencer Cossalter (Department of Civil Engineering)

Ashraf Saramah (Department of Electrical Engineering)

Meghan Chiodo (Department of Civil Engineering)

*Stephen Druschel, Faculty Mentor (Department of Civil Engineering)*

\*Recipient of Undergraduate Research Conference Small Grant

### **Effect of Temperature on Polyglutamine Tract Mutation Rate in Bacteria**

Han Lee (Department of Biological Sciences)

*Geoffrey M. Goellner, Faculty Mentor (Department of Biological Sciences)*

\*Recipient of Undergraduate Research Conference Small Grant

Huntington's disease (HD) is a severe genetic disorder with progressive neurodegenerative symptoms, ranging from emotional disturbance to uncontrolled movements and mental deterioration. Symptoms typically manifest in mid-life, and life expectancy is between 10 and 25 years after disease onset. Interestingly, elongation of a contiguous tract of glutamines (glutamine; amino acid) in the *Huntingtin* protein, is the causative mutation underlying HD. In the "normal" human population, the HD glutamine tract length typically ranges from 6-36 amino acids in length (ie. It is polymorphic). In individuals afflicted with HD, DNA mutation causes the number of huntingtin polyglutamines to reach well beyond the normal range, and HD manifests. If the polyglutamine tract is >60, severe symptoms appear in young ages, and it is called juvenile HD. Currently, little is known regarding the conditions that favor or inhibit mutation rate of the HD gene. This research project investigated whether temperature has any effect on polyglutamine mutation rate in *Escherichia coli* (DH5 $\alpha$ ). *E. coli* with three different lengths of HD polyglutamine (Q33, Q45, and Q56) were grown at different temperatures, 33°C, 35°C, 37°C, and 39°C, and the lengths of the polyglutamine were compared with controls.

### **The effect of renal perfusion pressure on the baroreflex response to high blood pressure**

Dwight Hanson (Department of Biological Sciences)

Meredith Lovaas (Department of Biological Sciences)

*Penny Knoblich, Faculty Mentor (Department of Biological Sciences)*

\*Recipient of Undergraduate Research Conference Small Grant

Hypertension, or high blood pressure, affects 28.6% of the United States population. Blood pressure is controlled in the short term by a baroreflex response and in the long term by the kidneys via blood volume. The baroreflex mechanism changes heart rate and vascular resistance to correct blood pressure. It is unclear if the blood pressure at the kidneys can influence the baroreflex response. The current study investigated the effects of blood pressure at the kidneys on the baroreflex response. Female SHR and WKY rats were anesthetized and body temperature was maintained at 37°C. A breathing tube was placed in the trachea and catheters were placed in the brachial and femoral arteries to monitor blood pressure above and at the kidneys, respectively. The jugular vein was catheterized for the infusion of saline and phenylephrine, a vasoconstriction drug. An adjustable noose was placed around the aorta above the renal arteries, to control pressure at the level of the kidneys. Blood pressure and heart rate were recorded continually using Biopac hardware and a computer. After an equilibration period, an unregulated response was recorded by giving phenylephrine to produce an increase in blood pressure for 3 minutes. The rat was allowed to recover and the phenylephrine dose was repeated, but the aortic noose was tightened to prevent a rise in blood pressure at the kidneys. The changes in heart rate in response to the rise in blood pressure were compared between the infusion with unregulated kidney pressure and the infusion with controlled kidney pressure.

### **Examination of cardiovascular development in the offspring of maternal SHR rats with impaired aldosterone secretion during pregnancy, using a remote monitoring system.**

Susan Gerbensky (Department of Biological Sciences)

Crystal Taylor (Department of Biological Sciences)

*Penny Knoblich, Faculty Mentor (Department of Biological Sciences)*

\*Recipient of Undergraduate Research Conference Large Grant

The theory “fetal origins of adult disease” states that adverse maternal conditions can produce fetal effects that increase the likelihood of adult disease. Factors affecting maternal rats such as poor nutrition, reduced uterine or placental blood flow, and, increased adrenal hormone levels, produce small fetuses. These fetuses are prone to developing hypertension (high blood pressure) later in life. Aldosterone, secreted from the adrenal gland, acts on the kidney’s tubules to increase sodium reabsorption, thus raising total body sodium, blood volume, and blood pressure. The goal of this project was to determine the effect of *reduced* aldosterone levels in maternal rats on the blood pressure of the offspring. Surgery was performed on 8 week old female SHR rats using sterile techniques. The adrenal gland on the right side was carefully removed, and the outer layer of the adrenal gland on the left side was destroyed by freezing it with liquid nitrogen. A sham surgery was also performed on rats by surgically opening and closing the rats in the same way, but leaving the adrenal glands undisturbed. Ten days post surgery, the females were mated with a male rat of the same strain. Once the pups reached 12 weeks of age, three males were randomly selected from each litter for implantation of a telemetry device that sends blood pressure and heart rate measurements to a receiver attached to a computer. The blood pressures and heart rates will be compared between the offspring of adrenal frozen rats, and the offspring of sham rats.

### **Expression of Lipoxygenase Isoforms in Wounded Pea Leaves**

Ifedi Obidiegwu (Department of Chemistry & Geology)

*Terry Salerno, Faculty Mentor (Department of Chemistry & Geology)*

\*Recipient of NorthStar STEM Alliance Award

Lipoxygenases (LOX) are a group of enzymes that are widely distributed in plants. There are at least five different LOX enzymes in peas. Little is known about their specific roles, although some change in amount at different stages of development. Mechanical wounding of pea leaves has shown that general LOX activity increases with peaks of activity observed at 6 hours and 24 hours after wounding. None of these studies measured individual LOX isoenzymes, and none used a very quantitative method to measure the expression of mRNAs. The purpose of this research was to measure the change in expression of LOX 1 and LOX 3 mRNAs in wounded pea leaves. The control and wounded plant leaves were harvested at 0, 3, 6, 12, and 24 hours after wounding. For each time point, the tissues from four plants (8 wounded leaves) were combined and quickly frozen in liquid nitrogen. Total RNAs from each duplicate sample were isolated using the RNeasy Plant Mini Kit (Invitrogen). The RNAs were made into copy DNAs using reverse transcriptase and random primers. Real time polymerase chain reaction (qPCR) primer and probes were designed and were used to measure differences in the levels of LOX 1 and 3 relative to a housekeeping gene (EF-1 $\alpha$ ). Initial studies have shown significant increases in the expression of both LOX isoforms twelve hours after wounding.



## **Waste Water Treatment Evaluation for Effect of Antibiotics on Septic Systems**

Carl J. Sorensen (Department of Civil Engineering)

Jacob D. Moser (Department of Civil Engineering)

Mark Origer (Department of Civil Engineering)

Adam Nix (Department of Civil Engineering)

*Stephen J. Druschel, Faculty Mentor (Department of Civil Engineering)*

\*Recipient of Minnesota State University, Mankato Foundation Grant

Septic systems utilize microbiological degradation to treat waste water, so it is important to investigate the effects of antibiotics passing through humans into septic systems. Residual antibiotics entering a septic system may kill enough microbes during the course of a prescription to limit the system's ability affectively treat waste. This loss of treatment by microbial degradation may cause a septic system to become clogged by the undegraded organic waste leading to hydraulic failure.

Our project involved designing and building a scale model septic system which was used to replicate the microbiological treatment which takes place in real septic systems. One model was used as a control, and a model was used for the experiment. Both models have septic tanks and drainfields, with an influent simulating the flow from of a residence into a septic tank. The experiment involved dosing the septic system with the antibiotic amoxicilin, then monotoring the treatment ability of the system as well as the health of the microbe population. The treatment quality was monitored using pH, turbidity, and DO (dissolved oxygen) testing methods. The microbial population's health was monitored using flow cytometry which compared the number of living verse dead organisms. We ran three experimental trials at three different antibioticnc levels and corrilated the results to approximate the level amount of antibiotics that would cause failure in a residential septic system.

## **Determination of ABO Variants Using ASP/ SSCP Analysis**

Jessica German (Department of Chemistry & Geology)

*Theresa Salerno, Faculty Mentor (Department of Chemistry & Geology)*

\*Recipient of Undergraduate Research Conference Large Grant

The ABO blood system is the most commonly known of the blood type systems. It is composed of four different blood phenotypes: A, B, AB, and O. Each of these is made from two different genes. The different genes vary in just a few base pairs, and these differences are called single nucleotide polymorphisms (SNPs). Minor variants are not detected by normal blood typing, but they may be significant for the acceptance of blood transfusions or organ transplants. This study uses allele specific polymerase chain reaction (ASP) combined with single stranded conformation polymorphism (SSCP) to create gel patterns that distinguish among variant alleles. ASP is a method of amplifying DNA of a chosen sequence in the region containing one or more SNPs. SSCP uses denaturation, followed by quick cooling to create different foldings due to nucleotide changes. This combined method has successfully been used to detect common variants (A, B, O<sub>101</sub>, O<sub>201</sub> and O<sub>303</sub>). These were verified by the development of a quantitative PCR (qPCR) SNP genotyping method. Sequencing will be used to determine the SNPs of the unique patterns representing the uncommon variants. These methods will allow us to screen for the ABO blood types variants by quick and inexpensive methods.

## **Effect of Lowered Aldosterone Levels on the Expression of the GR, MR, NHE-1, and NHE-3 in Rat Tissues**

Ami Kim (Department of Chemistry & Geology)

*Theresa Salerno, Faculty Mentor (Department of Chemistry & Geology)*

Hypertension is a major health concern among adults because it can lead to premature death due to cardiac arrest. Prenatal programming of adult hypertension has also been studied, but the causes are not fully understood. While there are various possible causes to this, aldosterone is a key hormone that binds to mineralocorticoid receptors (MR) and this elicits the production of protein responsible for blood volume and pressure. Because glucocorticoid hormones can bind to both glucocorticoid receptors (GR) and MR, excess glucocorticoids have also been shown to contribute to hypertension. Additionally, studies have shown that sodium transport by the Na<sup>+</sup>/H<sup>+</sup> exchanger (NHE) can participate in a hypertensive response (Pinto et al., 2008). In this study, outer layer of adrenal glands of rats were cryo-destructed to lower aldosterone levels. The objective of this research was to look at the effect of lowered aldosterone levels on the expression of GR and NHE isoforms 1 and 3 in the kidneys and placenta tissues of spontaneously hypertensive rats (SHR) and non-hypertensive rats. RNA was isolated using RNeasy Plus Mini Kit (Qiagen) and quantified spectrophotometrically. Total RNAs were converted back to cDNA using reverse transcriptase and random primers. Primers and probes were designed for Quantitative PCR (qPCR) and have successfully been used to amplify target mRNAs. Preliminary results show no definitive differences between treated and untreated rat tissue but do show differences among rats.

## **Simple Chemical Tests for Monitoring Home-Brewed Biodiesel Quality**

Sandra Tambi (Department of Chemistry & Geology)

James Thorne (Department of Chemistry & Geology)

*Daniel Swart (Department of Chemistry & Geology)*

In the recent past, biodiesel has become an alternate source of renewable energy exhibiting a low net carbon load. Biodiesel, commonly synthesized from free used vegetable oils, potassium or sodium hydroxide, and methanol, can readily be made at home for a fraction of the cost of standard diesel. Previously, research on biodiesel production utilized complex chemical analysis techniques such as gas / liquid chromatography to evaluate product purity and reaction completion. Since it is not feasible for home-brewers to use such laboratory grade tests, the home-brewer of biodiesel must rely on several physical tests of purity which often produce unreliable results. By applying straightforward, inexpensive chemical analyses to the area of biodiesel quality control, it is the goal of the current work to provide the amateur biodiesel producer with simple tests for monitoring their biodiesel generation, thus increasing their yield and decreasing their level of possible waste.

Previously studies in the literature have shown that biodiesel production relies heavily on factors such as temperature, time, and mole ratios of reagents and catalyst. In this current study, the parameters of biodiesel production were varied to affect the purity and quality of the biodiesel product. Soap production and yield from these modified processes were measured via simple acid titration. Incomplete reaction products (mono and diglycerides) and intermediates were monitored by various simple and affordable planar chromatography techniques (thin layer and paper chromatography). Results of these home-brew friendly tests were corroborated versus the benchmark of gas chromatography.

## **Use of Q-PCR to Monitor Expression of Vegetative Lipoxygenase in Soybeans**

Sarah Wageman (Department of Chemistry & Geology)

James Rife, Faculty Mentor (Department of Chemistry & Geology)

Lipoxygenases (LOX) catalyze the addition of molecular oxygen to 1, 4-pentadiene systems in polyunsaturated fatty acids to form hydroperoxides. Soybeans have many different LOX isoforms. Three different isoforms have been found in the seeds while at least seven distinct isoforms in vegetative tissue have been reported. Several functions have been proposed for these enzymes including production of defense molecules, lipid metabolism and nitrogen storage. The focus of this project was to explore the roles of the vegetative LOX isoforms in soybeans by measuring their expression in different tissues at different developmental stages. The effects of wounding and nitrogen supplementation on LOX expression were also studied. RNA was isolated from roots, stems, cotyledons and leaves. Reverse transcription was used to make cDNA copies of the mRNAs. Quantitative Polymerase Chain Reaction (Q-PCR) was conducted to measure relative quantities of these cDNAs from different samples. Primers were designed to selectively amplify LOX 5, 6, 7 and 9 cDNAs and successfully amplified LOX 5, 7 and 9. Efficiency studies indicated that Q-PCR could quantify expression of these different LOX enzymes over a range of four orders of magnitude. Melt curves signified that the primers successfully discriminated between the different LOX mRNAs. Leaves from a control plant at ten days post germination suggested different amounts of each of the forms, with LOX 5 expression being the largest. Tissue has been harvested from plants at different developmental stages, wounding conditions and levels of nitrogen supplementation for future Q-PCR analysis.

## **Investigation of the correlation between viability and optimal oxygen demand of dormant *Mycobacterium avium* subsp. *paratuberculosis***

Lauren Kinhead (Department of Biological Sciences)

Timothy Secott, Faculty Mentor (Department of Biological Sciences)

\*Recipient of Minnesota State University, Mankato Foundation Grant

*Mycobacterium avium* subsp. *paratuberculosis* (Mpt) is the causative agent of Johne's disease, a chronic and often fatal enteritis in many ruminants. In the U.S., Mpt infections in dairy cattle are a significant cause of economic loss. It is known that clinically diseased cattle shed large numbers of Mpt; however sub-clinically infected animals excrete Mpt intermittently and may therefore pose a risk of infection to the rest of the herd. Moreover, mycobacteria can enter a dormant state *in vivo*. These organisms may be susceptible to oxidative damage and death due to the sudden surge in metabolic rates resulting from culture in rich, selective media. The current method for culturing Mpt from cattle feces does not take into account the reduced metabolic rate of dormant Mpt. If the optimal amount of oxygen required for Mpt to divide in the microenvironment can be determined, then reducing oxygen in the culture microenvironment may assist in culturing these organisms by allowing them to recover. The primary goal of the research is to develop a system that will provide the ability to recover viable but not culturable Mpt by determining the relationship between the percent of viable organisms and the optimal oxygen requirement of those organisms. Viability (a ratio of live to dead organisms) was measured using a flow cytometer. Broth cultures containing doubling dilutions of Oxyrase, an enzyme that depletes oxygen in the microenvironment, were used to determine the optimal oxygen demand for the resuscitation of dormant organisms.

### **Antimutagenic Role of Cinnamaldehyde and Vanillin with Guanosine**

Katelyn Taylor (Department of Chemistry & Geology)

*Danaé Quirk Dorr, Faculty Mentor (Department of Chemistry & Geology)*

Cinnamaldehyde and vanillin, compounds in cinnamon and vanilla respectively, have shown the ability to induce repair of mutations in DNA. DNA is a double helix shaped macromolecule consisting of complimentary base components; adenine and thymine, and cytosine and guanine. Mutations in DNA occur when the sequence of the bases change. Changes in the DNA sequence can lead a cell to become cancerous. This focus of this research was the synthesis of the possible products of the reaction that cinnamaldehyde and vanillin undergo with guanosine. These products will be used to determine how these compounds found in our food can induce the repair of mutated DNA.

### **From GFP to pFLAG: Confirmation of Intracellular Location of KIAA1946.**

Anita Becker (Department of Biological Sciences)

Jessica Appel (Department of Biological Sciences)

*Geoffrey Goellner, Faculty Mentor (Department of Biological Sciences)*

\*Recipient of Undergraduate Research Conference Large Grant

Although significant advances have been made in deciphering the human proteome, there are still close to 8,000 genes whose functions are still completely unknown. In this study, we have attempted to determine the cellular location of one such novel gene product- KIAA1946. Indeed, very little is known regarding KIAA1946's normal function in cells. However, we do know that it is likely expressed in the nervous system, and it has a polyglutamine region in its primary amino acid sequence- two interesting features as other polyglutamine proteins have been linked to severe neurodegenerative diseases such as Huntington's chorea. Previous studies (using green fluorescent protein- GFP) in our laboratory have shown that KIAA1946 likely localizes to cytoplasmic vesicles. In the current study, we have attempted to confirm this initial data by using standard molecular biology tools (such as restriction digestion and ligation) to sub-clone KIAA1946 into a vector containing the FLAG epitope (commercial antibodies are available against FLAG). We checked for proper cloning of our FLAG-KIAA1946 fusion protein using restriction digestion coupled to agarose gel electrophoresis- and also officially confirmed our clone integrity using DNA sequencing. Next, we transfected our new FLAG-KIAA1946 clone into tissue culture animal cells, and allowed several days for the protein to appropriately localize within the cells. Finally, we employed immunofluorescence microscopy using antibodies against the FLAG moiety to "visualize" the location of our fusion protein. Data regarding KIAA1946's location within cells will provide us invaluable insight regarding the normal cellular function of this novel polyglutamine protein.

## **Flow Visualization Apparatus Restoration and Analysis**

Josh Braband (Department of Mechanical Engineering)

*Patrick Tebbe, Faculty Mentor (Department of Mechanical Engineering)*

In fluid dynamics much can be learned by studying how fluids flow around and through various objects. These flows can be analyzed using different equations and can be graphed using streamline functions. The P6247 Cussons Technology Flow Visualization Apparatus allows for flows of a range of speeds to be visualized in and around different objects. The purpose of this experiment was to repair the existing Flow Visualization Apparatus and then photograph the flow around different objects to compare the experimental flow with the expected flow patterns of the object. The Flow Visualization Apparatus was found tucked away in a corner of a lab at Minnesota State University Mankato and out of working order after being out of use for 15 years. Parts of the apparatus were replaced and others repaired so that the apparatus was once again in working order. Different objects were then analyzed at different speeds of flow. By varying the lighting of the apparatus and the shutter speed of the camera the variations of the flow were captured photographically. It was found that the flow fields observed in the testing apparatus matched the expected visual representation of the flow. The repair and verification of the Flow Visualization Apparatus allows this piece of equipment to be used as a demonstration tool so future students will be able to see how fluids flow in and around objects.

## **Improvements to UHMWPE**

Brooke McKelvogue (Department of Mechanical Engineering)

*Patrick Tebbe, Faculty Mentor (Department of Mechanical Engineering)*

Ultra high molecular weight polyethylene (UHMWPE) is a material used in artificial implants for articular joint replacements. However, these implants have a limited lifespan in which the patient will be pain-free due to the wear of the UHMWPE components. Recently crosslinking has been used to extend the wear resistance of UHMWPE. Although crosslinking introduces another set of drawbacks; mainly the reduction of the fracture toughness of UHMWPE and the generation of free radicals which leave the polymer vulnerable to damage from oxidation. Currently, research is being conducted on other methods to increase the wear resistance of UHMWPE including the introduction of filler particles into the polymer and lubrication or other cushioning methods that could make the implant more like a natural joint. This project is a review of the current research.

## **Purification and isolation of components of *Vernonia amygdalina* extracts demonstrating antioxidant activity and flavonoid content**

Cybill E. Okitikpi (Department of Biological Sciences)

*Danaé Quirk Dorr, Faculty Mentor (Department of Chemistry & Geology)*

\*Recipient of NorthStar STEM Alliance Award

Antioxidants are known to demonstrate anti-carcinogenic, anti-inflammatory and cardio-protective activities as a result of their ability to quench free radicals. Previous studies have shown that antioxidant compounds contain phenols. Previous studies have also shown that *Vernonia amygdalina* (VA) possess antioxidant activity, as well as phenols and flavonoids. The goal of my project was to purify components of extracts of VA and isolate the components that showed activity. The dried samples of VA were ground, and extracted with methanol, acetone, ethyl acetate, dichloromethane and hexanes. The extracts were then dried under reduced pressure using a rotary evaporator. Purification processes that were employed included both silica-gel and alumina flash column chromatography. The eluents were collected while running solvents such as hexanes, ethyl acetate, and methanol in series of fractions. The eluents were then examined using thin layer chromatography, for specific regions of activity. Silica gel and Alumina are the two most widely used adsorbents in thin layer and column chromatography because they are insoluble in most mobile phases and because their polarity aids in the separation of molecules of solutes to be separated. The various isolated components of VA were then analyzed by infra-red (IR) spectroscopy and nuclear magnetic resonance (NMR) spectroscopy to determine their composition.

## **Are Fall Leaves a Viable Feedstock for the Production of Cellulosic Ethanol?**

Nicholas A. Menne (Department of Biological Sciences)

*James E. Rife, Faculty Mentor (Department of Chemistry & Geology)*

The purpose of this project is to assess autumn leaves as a feedstock for ethanol production. This issue is immensely important, as civilization is on the verge of exceeding its energy supply, which would cripple the economy and cause countless problems for our society. This research can contribute to the development of autumn leaf biomass as an alternative fuel to ultimately reorganize the economy from being oil dependent to using renewable energy resources. Preliminary work by Burum (JUR, 2008) characterized the structural polysaccharides in leaf litter. The current study repeated his analysis and began strategies for optimizing the production of ethanol from leaves. Characterization of the structural polysaccharides and lignin demonstrated that oven dried leaves are 14.0% acid soluble lignin, 28.7% acid insoluble lignin, 1.6% acid insoluble ash, 16.2% cellulose, 2.7% arabinan and 2.2% xylan.. Comparison of various pretreatments followed by enzymatic hydrolysis gave the following recoveries of available glucose: dilute sulfuric acid pretreatment gave 62%, dilute phosphoric acid pretreatment 44%, pH 4.8 sodium acetate pretreatment 39%, pH 4.8 sodium citrate buffer 48% and pretreatment with a water control 61%. It is interesting that pretreatment with water is almost as effective as pretreatment with dilute sulfuric acid. While leaf litter may have lower amounts of cellulose compared to other plant biomass, that cellulose appears to be more accessible to enzymatic hydrolysis. This can reduce cost and minimize environmental impact, which would increase the viability of leaf litter as a feedstock for cellulosic ethanol.

## **Analysis of the CAG Trinucleotide Repeat in the Novel Polyglutamine Protein KIAA1946- Exclusion of this Genetic Locus as a Candidate Gene for Neurodegenerative Disease.**

Eric Miller (Department of Biological Sciences)

Travis Mrkvicka (Department of Biological Sciences)

*Geoffrey Goellner, Faculty Mentor (Department of Biological Sciences)*

\*Recipient of Minnesota State University, Mankato Foundation Grant

In 1872, an American physician, George Huntington first described a condition, later named Huntington's disease (HD), in which middle-aged, healthy, and competent adults experience a loss of control over bodily movement and function. In 1993, the causative mutation was found to be an expansion of a specific triplet repeat DNA sequence (CAG- which codes of amino acid glutamine) within the huntingtin gene.

Interestingly, the exact number of glutamines in the huntingtin gene normally varies from person to person; thus, it is polymorphic. However, expansion beyond the normal polymorphic range causes HD.

Subsequently, a number of other severe neurodegenerative diseases have also been found to be "polyglutamine" diseases. The recent completion of the human genome sequencing project has revealed other uncharacterized proteins with long glutamine stretches in their primary amino acid sequence. One such orphan gene is called KIAA1946. Using standard molecular biology techniques, such as PCR and DNA sequencing, we have investigated whether KIAA1946's polyglutamine region is also polymorphic within the normal human population- and therefore a candidate gene for neurodegenerative disease. Preliminary results suggest that the glutamine stretch in KIAA1946 is in fact quite stable. Indeed, the most prevalent allele matches identically to the published sequence: CAA(CAG)<sub>8</sub>(CAA)<sub>5</sub>CAGCAA. Our results suggest that KIAA1946 should not be considered a strong candidate gene for neurodegenerative disorders not yet genetically characterized.

## **Investigation of *cis*- and *trans*- Chromium(III) Chloride Aquation**

Marjorie J. Ploeger (Department of Chemistry & Geology)

*Daniel J. Swart, Faculty Mentor (Department of Chemistry & Geology)*

It has been observed that chromium (III) ions in aqueous solutions freshly prepared from the chloride salt exhibit a slow yet distinct absorption shift corresponding to a color change from green to blue that takes place on a timescale of ~ 24 hours under "normal" laboratory conditions. Previous literature studies have suggested that this color change is due to the stepwise replacement of the 2 coordinated chloride ions with water. While the *cis*- and *trans*- dichlorotetraaquo chromium (III) isomers exist, only the *trans*- form is produced via the above procedure. However, both isomers can be produced in high chloride concentration solutions. Previous estimates of the *trans* → *cis* isomerization rate are not explained solely by one-step kinetics. It has been suggested that a multistep process involving the trichlorotriaquo- species may be the cause of this high rate, but to date this species has never been verified.

Our previous investigation of chromium (III) aquation reactions utilized spectral factor analysis (FA) to monitor species and *trans*- kinetics (URC, 2007). The current study is an extension of this earlier work, and focused on the verification of the existence of the trichlorotriaquo- species, its corresponding kinetics, and the ability of spectra FA to track the concentrations of multiple species during isomerization and aquation. Kinetic data derived from the FA was also used to estimate the difference in aquation rates of the *cis*- and *trans*- isomers. It is hoped that these studies may form the basis for instructional laboratories on factor analysis, kinetics, and complexation reactions.



## **Fluoroquinolone antibiotic complexes involving heavy metals, ciprofloxacin, and phenolic degradation products: Potential relevance in ground and waste water systems**

Indumini A. Weeramantri, (Department of Chemistry & Geology)

Trista L. Ayers, (Department of Chemistry & Geology)

Thomas G. Smith (Department of Chemistry & Geology)

*Trent P. Vorlicek, Faculty Mentor (Department of Chemistry & Geology)*

\*Recipient of Minnesota State University, Mankato Foundation Grant

Pharmaceutical literature indicates that metal-fluoroquinolone complexes are highly stable and often have increased antimicrobial activity relative to the uncomplexed fluoroquinolone. However, minimal research has been conducted regarding the role metal-fluoroquinolones play in environmental systems. Our research aims to characterize novel metal-fluoroquinolones potentially relevant in ground and wastewaters. Stoichiometric analyses of aqueous test solutions showed a highly insoluble 1:2:1 ternary complex formation between cadmium (Cd; a heavy metal found in animal wastes), ciprofloxacin (a common veterinary fluoroquinolone antibiotic) and 4-nitrophenol (an herbicidal degradation product) at dilute  $\mu\text{M}$  concentrations and  $\text{pH} = 7$ . A 1:2:2 complex formed from similar solutions containing 2-chloro-4-nitrophenol. Furthermore, results pointed to the likely formation of an insoluble ternary complex between Cd, ciprofloxacin, and 2,6-dichloro-4-nitrophenol or 2-chloro-4,6-dinitrophenol. However, an insoluble complex did not form from similar solutions containing 2,4-dichlorophenol or 2,4,6-trichlorophenol. Electrochemical experiments were performed to determine the presence of any soluble complexes between Cd, ciprofloxacin, and the phenolic compounds. Experiments at varying pH demonstrated that the base form of phenol is required for complex formation, implying phenolic compounds with  $\text{pK}_a < 8$  may be viable ligands at typical ground and wastewater pH. Stoichiometric, spectroscopic, and stability experiments involving other transition metals (Fe, Cu, Zn), ciprofloxacin, and chlorinated nitrophenols or chlorinated phenols are ongoing. These results potentially point to an unaddressed reaction pathway available to heavy metals, powerful antibiotics, and toxic phenolic degradation compounds.

## **Measuring Low Levels of $^{14}\text{N}$ Using the $^{14}\text{N}(\text{d},\text{n})^{15}\text{O}$ Reaction**

Christopher Prokop (Department of Physics)

John Clymer ((Department of Electrical Engineering)

Nick Compton (Department of Physics & Astronomy)

Adam Hanson (Department of Physics & Astronomy)

Henry Dam (Department of Physics & Astronomy)

*Andrew D. Roberts, Faculty Mentor (Department of Physics & Astronomy)*

MNSU's Applied Nuclear Science Laboratory has restored and is now operating a Van de Graaf particle accelerator. Since the project started in 2007, we have successfully rebuilt the accelerator and continue to optimize its performance. We have successfully repaired the stabilization controls and have calibrated the machines energy using the characteristic resonances at 340 keV from the  $^{19}\text{F}(\text{p},\alpha)^{16}\text{O}^*$  reaction. This year's research has expanded the range of particle beams the machine can produce. The accelerator has been equipped with a tank of deuterium allowing the production of a deuteron beam. We report on the production of a confirmed deuteron beam using the  $^{14}\text{N}(\text{d},\text{n})^{15}\text{O}$  reaction and beam dynamic analysis. The nuclear reaction creates  $^{15}\text{O}$  from the deuterons colliding with  $^{14}\text{N}$ . As the  $^{15}\text{O}$  then decays into  $^{15}\text{N}$ , positrons are emitted, the annihilation creates measurable gamma ray emissions. Due to the efficiency of detecting counts of decay products (1 in  $10^{16}$  atoms) this method can detect very low amounts of nitrogen in a given sample. This added capability will allow for further research and experiments including investigation of other deuteron reactions and neutron production from deuteron breakup – which allows for a range of neutron physics including material science experiments.

### **Effect of the group on individual choice in extreme geotaxis response in *Drosophila melanogaster***

Derek Schelling (Department of Biological Sciences)

Nicole Gilbert (Department of Biological Sciences)

Melissa Hanson (Department of Biological Sciences)

*Daniel P. Toma, Faculty Mentor (Department of Biological Sciences)*

\*Recipient of Minnesota State University, Mankato Foundation Grant

Is a behavior simply the sum of its parts? Do group responses equal the totality of the individuals constituting them? We asked this question based on classical experiments undertaken by Dr. Jerry Hirsch to select for extreme responses of the fly to gravity. These experiments constituted the first attempt to understand the genetics of a complex behavior. By breeding populations of flies walking up (away from gravity: negative geotaxis) and those that walked down (toward gravity: positive geotaxis) in a t-choice maze, he established *Hi* and *Lo* behavioral lines of flies, respectively. Previous studies of individual flies from these populations rigorously characterized their geotactic response and showed high reliability of the geotactic behavior, consistent with the population from which they were derived. Using this information we have screened individuals to determine whether they are *Hi* or *Lo* flies. We then ran these with a group of their parent population as a control, followed by a group of the opposite behavior. Such an experiment tells whether they would follow the group or behave strictly according to the geotactic behavior of the population from which they were derived. If changes occur within their response between these two populations, this possibly indicates a social component to the group response, independent of the behavior of the individual by itself. Data from individuals of the *Hi* line run with *Hi* and *Lo* populations have yielded results that may indicate a social component to the behavior.

### **Thermoelectrics with Applications to Waste Heat Recovery, Heat Sources, and HVAC Systems**

Joseph Belgarde (Department of Mechanical Engineering)

*Patrick Tebbe, Faculty Member (Department of Mechanical Engineering)*

When certain materials are joined at their junctions with dissimilar materials, and they generate a flow of electricity when a thermal gradient is acted upon between the junctions is familiarly known as the Seebeck Effect. This effect may be reversed, also known as the Peltier Effect, which is the distinctive ability to create a temperature variance while an electrical potential difference is applied among these junctions. With the world's stride to create a more efficient and clean environment, one must render technologies based on development of power extracted from waste heat, and the lack of emissions due to Peltier Cooling and Heating Systems. This review paper talks about the research done to optimize the performance of systems relating to heat sources and waste heat, as well as propose solutions to current issues pertaining to the energy crises. Thermoelectrics will be considered as the foundation to erect a new efficient and environmentally safe planet.

### **A Simple Circuit Model of a Flash Memory Cell**

Lindsay Stepan (Department of Electrical & Computer Engineering & Technology)

Hojoon Lee (Department of E Electrical & Computer Engineering & Technology)

*Tom Brown , Faculty Mentor (Department of Physics & Astronomy)*

*Brian Martensen, Faculty Mentor (Department of Mathematics & Statistics)*

In this project, we attempt to classically model the erase procedure of a flash memory cell, a quantum mechanical process. As a first approach, a simple circuit similar to that used to model a Josephson Junction (Strogatz, 1994) is considered. Comparisons of erase times from the model with values from actual devices will be discussed, as will model modifications.

### **Empirical Analysis of Costless Merge Pairing Heaps**

Joshua Vander Hook (Department of Computer Science)

*Dean Kelley, Faculty Mentor (Department of Computer Science)*

Pairing heaps are a family of data structures that have found wide use in networking and other applications. They are popular because of their ease of implementation, but a complete theoretical analysis is still an open question. Introduced in 2009, the Costless Merge Pairing Heap boasted a potential for increased performance over the original Pairing Heap. To validate the claim of increased performance, the new Costless Merge variant was tested against the original Pairing Heap (both two-pass and multipass variants). Tests included heap-sorting of large data sets and the Hold Model, which is used to simulate a fixed-size queue of discrete events.

## **Factors Affecting the Expression of 9,13-Hydroperoxide Lyase in Cucumbers**

Ashok Singh KC (Department of Chemistry & Geology)

Samee M. Ranginwala (Department of Chemistry & Geology)

*James E. Rife, Faculty Mentor (Department of Chemistry & Geology)*

\*Recipient of Undergraduate Research Conference Small Grant

Cucumbers produce 6 and 9 carbon-long aldehydes which not only are important flavor and fragrance compounds but may also play roles in the plant's defense against pathogens. These aldehydes are produced from polyunsaturated fatty acids in two steps. Lipoxygenases convert the fatty acids into hydroperoxides by addition of molecular oxygen to 1,4-pentadiene systems, which are then cleaved into the aldehydes by Hydroperoxide Lyases. Cucumbers apparently have an unique 9,13-Hydroperoxide Lyase (9,13-HPLase) that can cleave hydroperoxides at both the 9 and 13 positions on the fatty acid chain (Matsui, et al. *Phytochemistry* 67, 649-657, 2006). In previous studies, Ranginwala (*JUR*, 2009) used Real Time Polymerase Chain Reaction (Q-PCR) to confirm that wounding enhanced expression of 9,13-HPLase. Preliminary results suggested that wounding might elicit a systemic enhancement of 9,13-HPLase expression. In the current study, the Q-PCR procedure has been refined to elucidate whether wounding truly caused systemic enhancement of 9,13-HPLase expression rather than a localized effect. Cucumber plants were grown, and control and experimental samples were obtained from cotyledons as well as from primary and secondary leaves. Plants were treated with methyl jasmonate and norbornadiene to explore the mechanism of wound enhanced 9,13-HPLase expression. RNA was extracted from the samples and reverse transcription was used to make cDNA copies of the mRNA transcripts. The relative numbers of the cDNA were measured using Q-PCR. Preliminary studies have shown that 9,13-HPLase expression decreased in newer leaves compared to older leaves.

## **Development of a Multiplex DNA Typing Method**

Mohammad A. Ranginwala (Department of Chemistry & Geology)

*James Rife, Faculty Mentor (Department of Chemistry & Geology)*

Short Tandem Repeats (STRs) are locations on DNA where short nucleotide sequences are repeated tandemly. By measuring the number of repeats at specific loci, we can differentiate between individuals. The FBI uses 13 different STR loci on the human genome to link individuals to DNA samples. The objective of this project was to develop a multiplex Polymerase Chain Reaction (PCR) method that could use the LI-COR DNA Analyzer to simulate DNA typing commonly used in forensic labs. If successful, the method could be adapted to teaching labs. Since it was prohibitive to analyze all 13 CODIS STR sites, we focused on four STR loci used by the FBI that would give non-overlapping PCR products. The sites chosen were D13S317, D351385, TPOX, and CSF1PO as well as a sex-determining site, Amelogenin. In an initial analysis, four subjects supplied blood samples. Three of the subjects were siblings. We used a Purelink Genomic DNA Mini Kit from Invitrogen to isolate the DNA and Platinum Taq DNA Polymerase High Fidelity to amplify the DNA. The products of the PCR were analyzed on a Criterion 15% TBE gel. Since this initial analysis demonstrated that the PCR method worked, the samples were further amplified and compared on LI-COR DNA Analyzer to obtain better resolution of the PCR products. The study was expanded to investigate how kinship can be revealed with this method.

### **Parallel Implementation of SPARSKIT Using MPI on a Beowulf Cluster**

Joseph Dobmeier (Department of Mechanical Engineering, Department of Computer Science)

*Dean Kelley, Faculty Mentor (Department of Computer Science)*

*Steven Case, Faculty Mentor (Department of Computer Science)*

The finite element method (FEM) is an approximation technique used to simulate physical systems in many areas of science and engineering. A solution of high accuracy can be obtained by using many elements, at the cost of increased computation time. To mitigate this cost, the computation can be distributed across multiple processing units. The purpose of this research was to parallelize a FORTRAN library of iterative solver routines for FEM matrices called SPARSKIT using the message passing interface (MPI) protocol. Resulting computation times were then analyzed for speedup relative to the single processor solution. All computation was performed on the 140 processor Beowulf cluster at MSU.

### **Managing E. Coli Growth in Stormwater Catch Basins**

Eric Hanninen (Department of Civil Engineering)

Chandani Malla (Department of Civil Engineering)

Spencer Cossalter (Department of Civil Engineering)

Ashraf Saramah (Department of Electrical Engineering)

Meghan Chiodo (Department of Civil Engineering)

*Stephen Druschel, Faculty Mentor (Department of Civil Engineering)*

\*Recipient of Undergraduate Research Conference Small Grant

This research project concerns the management of Escherichia coli growth in stormwater catch basins. Stormwater E.coli is an indication of fecal contamination since E. coli lives in lower intestine of mammals. Stormwater runoff that passes through storm drainage systems typically will be treated for sediment but not treated for bio organisms. Since the majority of stormwater will outfall to surface water, the presence of E. coli in stormwater has significant risk to human health if people contact the water, possibly through recreation. The intent of this project is to aid government agency with economical and easy solution to control the population of E.coli in surface water. High and low dosing of biomaterial is being explored seeing as leaves and grass clippings frequently enter the drainage system. This is being done by adding high and low doses of compost material; used as an organic source. The use of a dilute bleach solution sprayed in catch basins substantially lowers the population of E.coli. Scale model concrete catch basins were created and filled with samples of stormwater taken from a manhole in the City of Mankato. The Most Probably Number (MPN) method was used for assessing the population magnitude and absence or presence of E.coli. Samples were taken from the catch basins both prior to and after bleach treatment to compare the effectiveness of the potential treatment method.

## Automotive Engineering Technology

### **58x Engine and Transmission Wiring Harness**

Jeremy Schwanke (Department of Automotive Engineering Technology)

*Gary Mead, Faculty Mentor (Department of Automotive Engineering Technology)*

### **Absorbing the Force from an Accident through an Impact Attenuator**

Eric Bruns (Department of Automotive Engineering Technology)

Chris Larson (Department of Automotive Engineering Technology)

*Gary Mead, Faculty Mentor (Department of Automotive Engineering Technology)*

### **Optimizing Air Flow on a Restricted KTM 525 Engine**

Paul LaSorsa (Department of Automotive Engineering Technology)

Devin Danielson (Department of Automotive Engineering Technology)

*Bruce Jones, Faculty Mentor (Department of Automotive Engineering Technology)*

### **Development of Baja SAE Powertrain**

James Carsten (Department of Automotive Engineering Technology)

Nicolas Gaines (Department of Automotive Engineering Technology)

*Craig Evers, Faculty Mentor (Department of Automotive Engineering Technology)*

### **Design and Development of a Turbocharged Flexible Fuel Engine for Motorcycle Street Use**

Derek Kvenvold (Department of Automotive Engineering Technology)

Brent Bennett (Department of Automotive Engineering Technology)

*Craig Evers, Faculty Mentor (Department of Automotive Engineering Technology)*

### **Three-Wheel Diesel-Electric Hybrid Commuter Vehicle**

Alexander W. Dombrowsky (Department of Automotive Engineering Technology)

Michael L. Sanford (Department of Automotive Engineering Technology)

*Bruce E. Jones, Faculty Mentor (Department of Automotive Engineering Technology)*

### **Small Engine Blended Ethanol Tem**

Matthew Shult (Department of Automotive Engineering Technology)

Andy Dick (Department of Automotive Engineering Technology)

*Gary Mead, Faculty Mentor (Department of Automotive Engineering Technology)*

### **Smart Car Hybrid Conversion**

Samuel Yoder (Department of Automotive Engineering Technology)

Jeremy Rupp (Department of Automotive Engineering Technology)

Phillip Wencil (Department of Automotive Engineering Technology)

*Bruce Jones, Faculty Mentor (Department of Automotive Engineering Technology)*

## **58x Engine and Transmission Wiring Harness**

Jeremy Schwanke (Department of Automotive Engineering Technology)

*Gary Mead, Faculty Mentor (Department of Automotive Engineering Technology)*

The purpose of this project was to research and ultimately design a 58x engine and transmission wiring harness. The newer harness design will allow Schwanke Engines to expand their market place further into the street and hot rod markets. With the continually changing design of the LS series engine, Schwanke Engines needed to advance its wire harness design to accommodate for the newer design of engines. The engine wiring harness is the series of wires that runs to the various sensors and controllers required to run an engine. The harness will be designed from the existing 24x harness that Schwanke Engines currently uses. The testing will be done to compare horsepower, torque, fuel economy, and reliability of the new 58x system in comparison to the 24x system. The presentation will include background data on the company as well as the development and research processes that were used to come to the conclusion of the project.

## **Absorbing the Force from an Accident through an Impact Attenuator**

Eric Bruns (Department of Automotive Engineering Technology)

Chris Larson (Department of Automotive Engineering Technology)

*Gary Mead, Faculty Mentor (Department of Automotive Engineering Technology)*

An impact attenuator is a deformable, energy absorbing safety device required for the Formula SAE (Society of Automotive Engineering) competition. The rules define that the attenuator must decelerate a frontal impact from a 661 lb vehicle run into a non-yielding impact barrier at a velocity of 23 ft/sec. The average vehicle deceleration must not exceed a force greater than 20 g's, with a peak deceleration less than or equal to a force of 40 g's. To determine the best energy absorbing material, factors like cost, weight and strength were taken into consideration. The two materials that were selected for testing were aluminum honeycomb and polystyrene high density foam. Calculations were done to determine what sizes of material would be sufficient to dissipate the energy. From these calculations, four foam pieces of varying sizes were selected along with one aluminum honeycomb piece. Testing had to be done to prove the calculations and determine which material and size would meet the Formula SAE rules while having the best cost to weight ratio. To do this, an apparatus was designed that held the attenuator in a material testing machine called a MTS. The MTS crushed the attenuator samples and registered the force on a computer. The force to crush each piece was collected and graphed. From this data, size and material were determined. After this, a decision was made on which material to use before making it and attaching it to the car.

### **Optimizing Air Flow on a Restricted KTM 525 Engine**

Paul LaSorsa (Department of Automotive Engineering Technology)

Devin Danielson (Department of Automotive Engineering Technology)

*Bruce Jones, Faculty Mentor (Department of Automotive Engineering Technology)*

Our project exhibits the Minnesota State University-Mankato Automotive Engineering Technology's involvement in optimizing air flow on a restricted KTM 525 engine. In compliance with the Formula SAE rules (Society of Automotive Engineers Collegiate Design Series) a 19mm restrictor must be placed in the intake system of the engine to reduce air flow. The ability of the engine to produce power relies heavily on its ability to draw air from the atmosphere into the combustion chamber. The more air that enters the engine the more power it can produce. The problem faced was maximizing air flow into the engine through the 19mm restrictor to produce a powerful competitive engine. The focus of this research project deals with the engine components that the air flows through to get from the atmosphere to the combustion chamber of the engine. These components include the intake manifold and the cylinder head. Data was collected from the original unrestricted components, research was conducted on air flow, and physical models were designed and fabricated. These models were then implemented onto the engine to verify our research.

### **Development of Baja SAE Powertrain**

James Carsten (Department of Automotive Engineering Technology)

Nicolas Gaines (Department of Automotive Engineering Technology)

*Craig Evers, Faculty Mentor (Department of Automotive Engineering Technology)*

Every year, students in the Automotive Engineering Technology program participate in the Baja SAE competition, an event sponsored by the Society of Automotive Engineers. The competition tasks participants to design, build and prepare a plan to market an off-road vehicle similar in size to an all terrain vehicle. This includes a full roll cage frame, suspension, and drivetrain designed around a 10 hp engine provided by Briggs & Stratton. At the same time the design must consider overall weight, driver ergonomics and reliability. For 2009-2010, the Baja SAE team's main focus was to develop an efficient and robust drivetrain. Research was directed towards a design that included components that were efficient in delivering power to the drive wheels, was compact and cost effective. A design was chosen that met the team's design requirements.



## **Design and Development of a Turbocharged Flexible Fuel Engine for Motorcycle Street Use**

Derek Kvenvold (Department of Automotive Engineering Technology)

Brent Bennett (Department of Automotive Engineering Technology)

*Craig Evers, Faculty Mentor (Department of Automotive Engineering Technology)*

This project is the designing, building, and testing of a turbocharged motorcycle engine that will be flex fuel compatible. The project started with a 1999 Kawasaki ZRX1100 naturally aspirated motorcycle. A turbocharged induction setup has been designed and built for this motorcycle, in addition to a custom fuel injection system. The project goal is to maintain reasonable gas mileage while doubling the horsepower measured at the rear wheel, without sacrificing motorcycle reliability and rideability. The machine will be capable of running either gasoline or ethanol. Several modifications are required for the longevity of the engine. Factors such as ignition timing and static and dynamic compression of the engine all must be altered. Research was required in the use of alcohol based fuels. The decision was made to use ethanol as our primary fuel source, due to its higher resistance to detonation, its cooling properties when atomized in the air stream, and also to demonstrate the viability of a renewable resource as a primary fuel in motor sports. An additional requirement is exceptional responsiveness to driver input. This presentation explains the goals, applied automotive research, modifications required to achieve project goals, and results of these changes as they affect performance, responsiveness, etc.

## **Three-Wheel Diesel-Electric Hybrid Commuter Vehicle**

Alexander W. Dombrowsky (Department of Automotive Engineering Technology)

Michael L. Sanford (Department of Automotive Engineering Technology)

*Bruce E. Jones, Faculty Mentor (Department of Automotive Engineering Technology)*

Hybrid technology is becoming a driving force in the automotive industry to increase fuel economy levels and further the search for alternative fuel sources. Automotive Engineering Technology seniors are designing a two occupant, three-wheel hybrid vehicle licensed as a motorcycle for low cost, high mileage, and safe commuter travel. The hybrid system is comprised of an 800cc turbo diesel engine driving the front two wheels of the vehicle and an electric motor driving the single rear wheel. This design is a through-the-road hybrid system which uses the electric motor to drive the vehicle at lower speeds and allows the diesel engine to be reserved for its most efficient operation at higher speeds. The electric motor is powered by a pack of lithium-polymer batteries that are charged via regenerative braking as well as a plug-in charger. Utilizing these advantages the vehicle should attain a fuel economy of over 100 miles per gallon.

### **Small Engine Blended Ethanol Tem**

Matthew Shult (Department of Automotive Engineering Technology)

Andy Dick (Department of Automotive Engineering Technology)

*Gary Mead, Faculty Mentor (Department of Automotive Engineering Technology)*

The purpose of this study was to determine the durability, wear, emissions, performance, and reliability of small gasoline engines running on E0, E10, E15, and E20. E10 being 90% gasoline and 10% fuel grade ethanol by volume. In 2005, the state of Minnesota passed legislation requiring 20% ethanol blended with 80% gasoline (E20), be available State wide by 2013. E10 is currently mandated at all pumps in Minnesota. Currently there is not enough data on the affects of ethanol blends in small spark ignition engines less than 25 horsepower. Without sufficient testing, it is difficult to predict how various engines will react to increased ethanol content in gasoline.

Three engine technologies were tested, and four identical engines from each technology were used to conduct the research. Each of the four identical engines ran on a different blend at the same time and was compared to the initial baseline testing data. These four engines were closely evaluated, after aging them for a specified time to identify if the blends of ethanol caused emissions, performance, or durability issues. Emissions were evaluated throughout the useful life of the engine and compared to the baseline results to distinguish the effects that the various blends may have had on emissions. Throughout the tests, the durability, and various temperatures were also measured and recorded. Lastly, the performance of the engines was looked at throughout the research by testing starting performance.

### **Smart Car Hybrid Conversion**

Samuel Yoder (Department of Automotive Engineering Technology)

Jeremy Rupp (Department of Automotive Engineering Technology)

Phillip Wencil (Department of Automotive Engineering Technology)

*Bruce Jones, Faculty Mentor (Department of Automotive Engineering Technology)*

The Smart ForTwo CDI is a two passenger vehicle currently produced by Mercedes Benz in Europe and is powered by a small internal combustion engine. The main goal of this project consisted of the implementation of a custom electric drive system to accompany the existing engine to increase overall fuel mileage, while also reducing overall pollution outputs. The system was combined in a through the road hybrid system with the rear wheels being powered by the 3 cylinder diesel combustion engine, and the front wheels powered by the electric system. The combination of the efficient diesel engine and electric hybrid system gave us an overall vehicle that is not only fuel efficient, but environmentally friendly. Components were carefully selected to maximize the vehicles overall efficiency, therefore decreasing the amount of wasted energy. The development of this vehicle helped us learn about new technologies of the future that will help reduce our country's dependence of foreign oil, and help keep our planet environmentally safe to live in.

## Biological Sciences

**Effects of Reduced Aldosterone on Organ Damage in Hypertensive and Normotensive Rats**

Yusuf Opakunle (Department of Biological Sciences)

*Penny Knoblich, Faculty Mentor (Department of Biological Sciences)***Inhibition of Cattail Germination by Interspecific and Intraspecific Cattail Root Extracts**

Lauren Beal (Department of Biological Sciences)

*Bradley Cook, Faculty Mentor (Department of Biological Sciences)***Determining the Utility of Wildlife Underpasses in Minnesota**

Donald J. Nelsen (Department of Biological Sciences)

*John D. Krenz, Faculty Mentor (Department of Biological Sciences)***Clarity of OTC mark on Northern Pike otoliths using different microscope filters**

Merissa Oswald (Department of Biological Sciences)

*Shannon Fisher, Faculty Mentor (Department of Biological Sciences)***Methods of detecting injury in Bacillus cereus**

Adeline Ngum (Department of Biological Sciences)

*Dorothy Wrigley, Faculty Mentor (Department of Biological Sciences)***The Effects of Population Models on the Giant Panda**

Ashley Maher (Department of Biological Sciences)

*Anne-Marie Hoskinson, Faculty Mentor (Department of Biological Sciences)*

## **Effects of Reduced Aldosterone on Organ Damage in Hypertensive and Normotensive Rats**

Yusuf Opakunle (Department of Biological Sciences)

*Penny Knoblich, Faculty Mentor (Department of Biological Sciences)*

The two adrenal glands are endocrine glands located on the top of both kidneys. The adrenal glands secrete several hormones which include aldosterone. Aldosterone, secreted from the outer layer of the adrenal cortex is responsible for sodium, water and potassium balance in the body. Increased levels of aldosterone in the blood causes an increase in sodium reabsorption which stimulates an increase in water retention. This leads to an increase in blood volume which in turn leads to a higher blood pressure. Aldosterone is also reported to have a role in cardiac fibrosis (scarring) and tissue damage.

The goal of this project was to determine the effect of reduced aldosterone on the heart and kidneys of hypertensive and normotensive rats, using a process of adrenal freezing to lower aldosterone levels. Surgery was performed on 6 weeks old rats using sterile techniques. The adrenal gland on the right side was carefully removed and the incision was closed. The outer layer of the adrenal gland on the left side was destroyed by freezing it with liquid nitrogen. The gland was returned to the original position and the incision closed. A sham surgery was also performed on rats by surgically opening and closing the rats in the same way, but leaving the adrenal glands undisturbed. After at least 8 weeks post surgery, resultant changes in the heart and kidneys were studied.

## **Inhibition of Cattail Germination by Interspecific and Intraspecific Cattail Root Extracts**

Lauren Beal (Department of Biological Sciences)

*Bradley Cook, Faculty Mentor (Department of Biological Sciences)*

Three species of cattails are common in the upper Midwest. *Typha latifolia* is native to North America, *T. angustifolia* is an exotic species introduced from Eurasia, and *T. x glauca* is a hybrid between *T. latifolia* and *T. angustifolia*. *Typha angustifolia* and *T. x glauca* are invasive species that are reducing the biological diversity of many wetlands in southern Minnesota and have become difficult to manage. Individuals of each species produce ~250,000 seeds each year but preliminary genetic profiles of cattail communities suggest that each species primarily reproduces clonally through rhizomes. Therefore, seeds are not effective locally and invasive clonal reproduction suggests that a strong competitive mechanism is at work. Some research suggests that *T. latifolia* releases auto-toxic root exudates that inhibit germination of conspecifics and *T. angustifolia* has a similar allelopathic effect on native heterospecifics. Here we tested the effects of cattail root extracts on cattail germination for all interspecific and intraspecific combinations and using deionized water as a control in bioassays. From field observations *T. latifolia* has the fewest conspecific neighbors and *T. x glauca* has the fewest heterospecific neighbors. We predict that *T. latifolia* will have the strongest inhibitory effect on the germination of conspecifics and *T. x glauca* will have the strongest inhibitory effect on the germination of heterospecifics.

### **Determining the Utility of Wildlife Underpasses in Minnesota**

Donald J. Nelsen (Department of Biological Sciences)

*John D. Krenz, Faculty Mentor (Department of Biological Sciences)*

Wildlife underpasses have been designed into some new wide-span bridges in northern Minnesota to provide a safer alternative to over-the-road crossings. Are wildlife, particularly deer, using the underpasses? Are over-the-road crossings decreasing near bridges? For 4 months pre-construction and for 18 months post-construction (and ongoing), we used trail cameras to monitor movements under four bridges and at the forest edge along the highway at three distances from the bridges. We have observed several species of wildlife using the underpasses. We will describe whether the frequency of use of underpasses by deer is increasing. We will analyze the frequency of deer movements along the road near the bridges to determine whether it is decreasing and whether it is less than pre-construction levels.

### **Clarity of OTC mark on Northern Pike otoliths using different microscope filters**

Merissa Oswald (Department of Biological Sciences)

*Shannon Fisher, Faculty Mentor (Department of Biological Sciences)*

Oxytetracycline (OTC) is used to mark bony structures on fish to estimate the age of the fish. The inner ear bones, otoliths, are used to read OTC marking because otoliths are the easiest bony structure to get a quality age reading. The prepared otolith is placed under a microscope with a filter and ultraviolet light to read the OTC mark. The filter gives the otolith a color and the mark a different color. Different filters exist. One filter makes the otolith green and the OTC mark yellow, while another filter makes the otolith blue and the OTC mark red. I investigated the clarity of the OTC marks using 3 different filters. Northern pike were marked with OTC as fingerlings and stocked in a rearing pond. The age zero fish were then gathered and the otoliths were removed, dried, sanded, and fixed to a slide. The OTC markers were read under 3 different filters and given a score of 0 to 4 (0 being no mark and 4 being a very distinct mark) to analyze the clarity of the OTC mark under each filter. More than one person read each mark to eliminate human eye bias. The results are still being collected. A study on efficiency of the different filters has not been conducted before. The goal of this experiment was to eliminate bias readings due to poor clarity of OTC marks. Greater contrast between colors the filter creates could produce more distinguishable marks and result in more accurate fish aging.

### **Methods of detecting injury in Bacillus cereus**

Adeline Ngum (Department of Biological Sciences)

*Dorothy Wrigley, Faculty Mentor (Department of Biological Sciences)*

Bacillus cereus is a gram-positive, spore forming bacteria that survives in food and causes food poisoning in humans. Injured cells are more readily killed than uninjured cells. Knowing how to injure Bacillus cereus may provide ways to eliminate its growth in foods. Injury is typically detected when cells die in stressful conditions. The project developed media to detect injured cells. First, Bacillus cereus was frozen at two different temperatures  $-20^{\circ}\text{C}$  and  $-80^{\circ}\text{C}$  to check for survival. The survival of the cells was measured by counting viable colony forming units before and after freezing. More cells were killed at  $-20^{\circ}\text{C}$  than at  $-80^{\circ}\text{C}$ . A selective medium is needed to determine if surviving cells were injured. A selective media was prepared with polymixin B to which Bacillus cereus is usually resistant. It is hypothesized that freezing damage to cell walls would increase the sensitivity to polymixin B, a membrane disruptor. Polymixin B (antibiotic) mixed with Bacillus cereus yielded an unexpected result. The tested concentration of polymixin B killed Bacillus cereus. Lower concentration of polymixin B are being tested, results will be presented. Sub lethal concentration of polymixin B should not kill uninjured cells, but may kill injured cells. Development of this as a selective medium will allow testing of other potential sources of injury

### **The Effects of Population Models on the Giant Panda**

Ashley Maher (Department of Biological Sciences)

*Anne-Marie Hoskinson, Faculty Mentor (Department of Biological Sciences)*

One of the most talked about endangered species in China and the world is the giant panda (*Ailuropoda melanoleuc*). Population models are quite commonly used to help researchers make decisions for managing wildlife populations of endangered species. I built a population model where the objective was to decide where researchers need to focus their attention when it comes to panda preservation. Population models were used in this research to predict how the populations of giant pandas may change over a period of time. In order to accomplish this, I used an age-structured model. This age-structured model was designed to show the total population of pandas at each age. Sensitivity analysis was chosen as the main focus because it can show the differences of variables and which ones affect the population the most. Sensitivity analysis is the study of how the variation (uncertainty) in the output of a mathematical model can be apportioned to different sources of variation in the input of a model. The results show that the focus should be on survival rates within the population with a surprising emphasis on adult survival more so than juvenile survival. Therefore, there needs to be a focus on expanding the panda's habitat, thereby increasing its chance for survival and lowering its genetic isolation.

## English and History

### **Beowulf: God, Men, and Monsters**

Emily Bartz (Department of English)

*Mary Johnston, Faculty Mentor (Department of English)*

### **Charlotte Smith – A Revolutionary Female Romantic Poet**

Brittaney Lettow (Department of English)

*Mary Johnston, Faculty Mentor (Department of English)*

### **Seduction, Premarital Sex, and the Law in Eighteenth-century France**

Kelly Heaney (Department of History)

*Christopher Corley, Faculty Mentor (Department of History)*

## **Beowulf: God, Men, and Monsters**

Emily Bartz (Department of English)

Mary Johnston, Faculty Mentor (Department of English)

*Beowulf* is an Anglo-Saxon epic poem translated into Modern English in 2000 by Seamus Heaney. My paper hypothesises that the central conflict of *Beowulf* is the struggle between the decentralising and supernatural ways of the ancients (Shield Sheafson, Grendel, and Grendel's Mother) and the centralising and corporeal values of the modern heroes (Hrothgar, Beowulf, and Wiglaf.) The poet traces a definitive move away from the ancient's pagan heroic values to his own Christian heroic values. However, as in the poet's contemporary culture, certain pagan traditions, such as familial fidelity, persist in *Beowulf*. The poet's audience, the Anglo-Saxons, honoured their pagan ancestors through story telling. The Christian leadership discouraged story telling since their ancestors were pagan and thus beyond salvation. The poet needed a subtle means of dealing with the obviously pagan and foreign content of the *Ur-Beowulf*. In *Beowulf*, he simultaneously acknowledges God's will and the heroism of their Norse ancestors. In addition, since the poet had a limited knowledge of Germanic and Norse life, he tells the story through his own Anglo-Saxon perspective.

## **Charlotte Smith – A Revolutionary Female Romantic Poet**

Brittaney Lettow (Department of English)

Mary Johnston, Faculty Mentor (Department of English)

Despite the turmoil, turbulence, and strain of her life as a young mother of twelve children married to an abusing and exhaustive husband, Charlotte Smith made a poetic persona out of her real life. She found the opportunity as a writer to strive for a deeper understanding of life, living, and society by immersing herself in nature. Through using her vantage point as an observer, Smith displayed and described in her works the aspects of melancholy, mortality, isolation, suffering, restraint, and the effects of war. Smith wrote with abhorrence towards the oppression and exploitation of women, slaves, and laborers alike, and she reflected on the tendency of mankind to ruin what is perfect and beautiful. She demonstrated her social criticisms in her work and gave readers a different set of identities to relate to and ultimately emphasize with. Her radical viewpoints, which had often been deemed questionable or dishonorable, were unheard of from a woman writer. However ground-breaking and controversial her works were for the society in which she lived and wrote, Charlotte Smith helped to revolutionize both the Romantic Period and 19<sup>th</sup> century poetry.



## **Seduction, Premarital Sex, and the Law in Eighteenth-century France**

Kelly Heaney (Department of History)

*Christopher Corley, Faculty Mentor (Department of History)*

Although sources revealing single women's lives in preindustrial Europe are scarce, paternity suits – official complaints filed by single women or their fathers against the women's sexual partners – are one type of source eighteenth-century historians have used to shed light on some aspects of single women's lives during the period. In an age without DNA testing, options available to women who became pregnant outside of marriage were limited, and historians have debated how much latitude and power these women had while they pursued their lawsuits. Researching premarital sex and pregnancy through paternity suits reveals at least one way women dealt with such issues in a given time and place. My research engaged this debate through an examination of several paternity suits in eighteenth-century Dijon, France. My mentor and I examined court documents from Dijon, including pregnancy declarations, initial complaints, witness depositions, and interrogations, both to understand courting rituals more generally and to assess women's legal options once they became pregnant. My research suggests that women did have more control over their situations than some historians have claimed. I found that women used a variety of legal strategies and often won their cases. These findings will encourage historians to re-evaluate women's relative authority, both within their families and in society at large.

Communication Disorders, Communication Studies, Community Health, Education, Family Consumer Science, Geography, Human Performance, Nursing, Psychology and Sociology & Corrections

**1 - Selective Language Skills of an Individual with Moebius Syndrome**

Mary Richter (Department of Communication Disorders)

*Bonnie Lund, Faculty Mentor (Department of Communication Disorders)*

**2 - Common Word Use in Adolescents with Williams Syndrome and their Typically Developing Peers**

Emily Wallin (Department of Communication Disorders)

Jessica Wandrie (Department of Communication Disorders)

*Patricia Hargrove, Faculty Mentor (Department of Communication Disorders)*

**3 - College Student Perceptions of Their Living Spaces**

Erik Heller (Department of Communication Studies)

*Lynn Kuechle, Faculty Mentor (Department of Communication Studies)*

**4 - Lyric analysis: Expressed perceptions regarding four health risk behaviors, using the Health Belief Model**

Sagal Abdirahman (School of Nursing, Department of Community Health)

*Amy Hedman, Faculty Mentor (Department of Community Health)*

**5 - Fostering Teacher Understanding of Dakota and Lakota Education Experiences: Past, Present, and Future**

Maggie Looft (Department of Elementary and Early Childhood Education)

Kiley Theede (Department of Elementary and Early Childhood Education)

*Elizabeth Sandell, Faculty Mentor (Department of Elementary and Early Childhood Education)*

*Gwen Westerman-Wasicuna, Faculty Mentor (Department of English)*

**6 - Taste Perceptions of International Students**

Derartu Teshite (Department of Family Consumer Science)

*Susan Fredstrom, Faculty Mentor (Department of Family Consumer Science)*

**7 - Food for Thought: Organic vs. Conventional**

Stephanie Kerkaert (Department of Family Consumer Science)

Lindsay Dalluge (Department of Family Consumer Science)

Sara Holmberg (Department of Family Consumer Science)

Travis Meger (Department of Family Consumer Science)

*Susan Fredstrom, Faculty Mentor (Department of Family Consumer Science)*

*Joye Bond, Faculty Mentor (Department of Family Consumer Science)*

\*Recipient of Undergraduate Research Conference Small Grant

**8 - Mapping Crime Locations on the Minnesota State University-Mankato Campus**

Ashley M. Keul (Department of Geography)

Chris P. Somage (Department of Geography)

*Forrest Wilkerson, Faculty Mentor (Department of Geography)*

\*Recipient of Minnesota State University, Mankato Foundation Grant

## **9 - The Development and Characteristics of Collegiate Basketball Coaches' Coaching Philosophies**

Tony Vroman (Department of Human Performance)

*Cindra Kamphoff, Faculty Mentor (Department of Human Performance)*

## **10 - Spirituality and Pediatric End-of-Life Care**

Janet Elizabeth Rother (School of Nursing)

*Jean Humphries, Faculty Mentor (School of Nursing)*

## **11 - Emotions Experienced After a Spontaneous Abortion**

Kelli Hogberg (School of Nursing)

Taryn Califano (School of Nursing)

*Jean Humphries, Faculty Mentor (School of Nursing)*

## **12 - Latino and Somali Immigrant Social Adjustment and Mental Health in South Central Minnesota**

Ayan Duale (School of Nursing)

*Diane Witt, Faculty Mentor (School of Nursing)*

## **13 - Surveying Case Managers about Current Practices Regarding Foster Youth**

Jacy Kraayenbrink (Department of Psychology)

Michael Hamilton (Department of Psychology)

*Carlos J. Panahon, Faculty Mentor (Department of Psychology)*

*Laura Strunk, Faculty Mentor (Department of Social Work)*

## **14 - Levels of Student Test Anxiety and Effort Put Into Succeeding**

Lauren Cardoni (Department of Psychology)

*Emily Stark, Faculty Mentor (Department of Psychology)*

## **15 - Treatment Integrity Reporting In School Psychology Journals**

Nicole E. Enfield (Department of Psychology)

Jessica M. Morales (Department of Psychology)

*Daniel D. Houlihan, Faculty Mentor (Department of Psychology)*

## **16 - Examining Pre-service Consultation Training in NASP-Approved Graduate Programs in School Psychology**

Brittany A. Foster (Department of Psychology)

Isaiah F. Biesanz (Department of Psychology)

Jacy N. Kraayenbrink (Department of Psychology)

Patricia D. Hopkins (Department of Psychology)

Jessica A. Day (Department of Psychology)

*Carlos J. Panahon, Faculty Mentor (Department of Psychology)*

## **17 - Surveying School Psychologists about Pre-service Training in Response to Intervention**

Patricia D. Hopkins (Department of Psychology)

Carissa A. Borchardt (Department of Psychology)

Michael A. Hamilton (Department of Psychology)

Jacy N. Kraayenbrink (Department of Psychology)

Aimee L. Kotten (Department of Psychology)

*Carlos J. Panahon, Faculty Mentor, (Department of Psychology)*

*Alexandra Hilt-Panahon, Faculty Mentor (Department of Special Education)*

\*Recipient of Undergraduate Research Conference Large Grant

**18 - Surveying Special Education Teachers about Pre-service Training in Response to Intervention**

Aimee L. Kotten (Department of Psychology)

Jessica A. Day (Department of Psychology)

Isaiah F. Biesanz (Department of Psychology)

Brittany A. Foster (Department of Psychology)

Carissa A. Borchardt (Department of Psychology)

*Carlos J. Panahon, Faculty Mentor* (Department of Psychology)

*Alexandra Hilt-Panahon, Faculty Mentor* (Department of Special Education)

\*Recipient of Undergraduate Research Conference Small Grant

**19 - Study Habits and Attitudes study**

Amanda Cyr (Department of Psychology)

*Emily Stark, Faculty Mentor* (Department of Psychology)

**20 - Propensity to Trust and Trusting Behaviors in Team Decision-Making**

Elizabeth Brielmaier (Department of Psychology)

*Andi Lassiter, Faculty Mentor* (Department of Psychology)

**21 - Decision Making and Personality**

Margaret Moe (Department of Psychology)

Natasha Olson (Department of Psychology)

*Emily Stark, Faculty Mentor* (Department of Psychology)

**22 - Stigmatic Views for Mental Health Disorders in a College Population 2**

Patricia D. Hopkins (Department of Psychology)

Carissa A. Borchardt (Department of Psychology)

Melissa A. Lenz (Department of Psychology)

*Barry J. Ries, Faculty Mentor* (Department of Psychology)

**23 - Making the History of Psychology a Story in South Central Minnesota**

Jessica Christenson (Department of Psychology)

Rachel Kruger (Department of Psychology)

Jenna Helget (Department of Psychology)

Amanda Vonbergen (Department of Psychology)

*Andi Lassiter, Faculty Mentor* (Department of Psychology)

**24 - Revisiting the Assessment of Punitiveness amongst College Students: A comparison of law enforcement majors with corrections majors.**

Briana Threatt (Department of Sociology & Corrections)

*Sherrise Truesdale-Moore, Faculty Mentor* (Department of Sociology & Corrections)

## **Selective Language Skills of an Individual with Moebius Syndrome**

Mary Richter (Department of Communication Disorders)

Bonnie Lund, Faculty Mentor (*Department of Communication Disorders*)

The purpose of this research was to learn about the qualitative research process and the selective language skills of an individual with Moebius Syndrome. After IRB approval, an audio-taped interview with the individual was conducted. With this data, I was able to look at factors that affected the individual's language skills such as environment, physical characteristics of Moebius Syndrome, and therapy received. Codes and subcodes were used to organize the information obtained in the interview and with these, six main patterns were extracted. These patterns and the data analysis allowed for an assertion to be made regarding the individual's experience growing up with Moebius Syndrome.

## **Common Word Use in Adolescents with Williams Syndrome and their Typically Developing Peers**

Emily Wallin (Department of Communication Disorders)

Jessica Wandrie (Department of Communication Disorders)

Patricia Hargrove, Faculty Mentor (*Department of Communication Disorders*)

This project investigated use of common words in adolescents with Williams syndrome. Williams syndrome is a developmental disability characterized by cognitive impairment and unique strengths and weaknesses in language skills. Speakers with William syndrome "have quite extensive and strong, language expression and acquisition. However, the ability to speak those words, in addition to complications with visuo-spatial recognition, can be impaired. What is commonly seen, then is a child with advanced vocabulary and a keen skill for grammar, with a poor ability to express speech and a poor ability to perform in areas that involve abstract thinking" (Cadena, 2007).

Our research is focused on semantic/vocabulary distinctions between adolescents with Williams syndrome (WS) and their typically developing peers (TDP). Specifically, we examined conversations for three hundred of the most common words in English, ranked in order of frequency. The first one hundred words make up about half of all written material, and the first three hundred make up about sixty-five percent of all written material.

We reviewed speech samples of twelve adolescents with WS and twelve TDP from a pre-existing database. The reviewers were not informed about the status (WS or TDP) of the participants. We calculated the relative frequency of the three hundred words for each of the participants.

The results will be discussed in light of the current literature on William syndrome.

## **College Student Perceptions of Their Living Spaces**

Erik Heller (Department of Communication Studies)

Lynn Kuechle, *Faculty Mentor (Department of Communication Studies)*

Every environment we surround ourselves in differs from the next. Depending on the environment, individual's perceptions may be altered when environmental factors are changed from previous ideas. Certain environments can increase or decrease the level of interaction or conversation, depending on the comfortably in which that person feels in these surroundings. This research study examines the different environmental factors and perceptions of college students living in the residence halls. Locations focused on inside the residence halls comprise of dorm rooms, community lounges, and general public spaces. Focus areas in this study include the effects of color, movable objects, layout and design of a room, as well as environmental features.

## **Lyric analysis: Expressed perceptions regarding four health risk behaviors, using the Health Belief Model**

Sagal Abdirahman (School of Nursing, Department of Community Health)

Amy Hedman, *Faculty Mentor (Department of Community Health)*

Adolescents often acknowledge music lyrics as an important channel for communication and expression of attitudes, values, and conflicts. An increased emphasis on health risk behaviors has been noted in songs with some containing explicit content that may affect young adolescents. A qualitative content analysis was conducted on music lyrics to measure the manner in which lyrics described four health risk behaviors: sex, violence, alcohol/drug use, and tobacco use. The songs included in the analysis were from the genres of pop, R & B/hip hop, rap, country, adult contemporary, modern rock, and latin. The songs for analysis were determined by "The Hot 50 Songs: Best of 2000-2009, according to Billboard Chart Services. Using the top 50 songs of the decade, the researcher tracked the occurrence and manner in which the identified four health risk behaviors were included, applying the Health Belief Model to measure mention of perceived risks, benefits, barriers, and self-efficacy. Preliminary results suggest reference to sex more often than any other health risk factor in the lyrics. However, the analysis has yet to be completed.

## **Fostering Teacher Understanding of Dakota and Lakota Education Experiences: Past, Present, and Future**

Maggie Looft (Department of Elementary and Early Childhood Education)

Kiley Theede (Department of Elementary and Early Childhood Education)

*Elizabeth Sandell, Faculty Mentor (Department of Elementary and Early Childhood Education)*

*Gwen Westerman-Wasicuna, Faculty Mentor (Department of English)*

Various researchers and reporters have documented the array of experiences that native students had in educational settings between 1879, when the Carlisle Indian Industrial School (in Pennsylvania) and others were established and youngsters were forced off the reservations, and the 1930s, when most boarding schools were closed. This project was designed to collect and to share information in order to better prepare teachers of Native students. The project gave Native elders an opportunity to record their education experiences in their own words. This study involved four in-depth, in-person interviews with Dakota and Lakota elders between 40 and 70 years old. Elders provided reflections on experiences of past generations, on their own educational experiences, on the preferred learning methods of Native students, and on their visions for teachers' practices and influences on Native children. Data analysis was conducted to identify themes. Stories and comments from elders were organized around those themes and produced in a video. Due to respect for the elders, no editorializing or conclusions were created. Future studies might include use of the video in MSU courses for future teachers and evaluating attitude shifts among the viewers.

## **Taste Perceptions of International Students**

Derartu Teshite (Department of Family Consumer Science)

*Susan Fredstrom, Faculty Mentor (Department of Family Consumer Science)*

International students may eat fewer fruits and vegetables in this country compared to when they were in their homeland because of differences in flavor. As part of a larger study comparing subjects' perceptions of taste of organic foods, the perceptions of international subjects were analyzed separately. Twenty seven international students participated in taste tests of four foods: carrots, celery, apples and bananas. Two samples were offered, but subjects were told their second sample was an organic product.. Subjects rated each sample on a hedonic scale of 1=dislike extremely and 9=like extremely. The samples were randomly assigned with three digit code number and presented on the 15cm white plates. Ratings of the two samples of each food were compared to evaluate how well the flavor of the each sample scored. In order to determine the difference Student's t-test was used. In addition, we gave them a short survey for the participants in order to find out their attitudes, beliefs, and behaviors regarding organic foods. No difference in the ratings of carrots, celery, apples, and bananas of the conventional and the organic products were found in this group. This finding is slightly different from the larger group of 100 subjects, where bananas were rated significantly higher when subjects were told they were organic. Foods offered were well-liked by international students, although some had not tasted celery previously. International students' taste perceptions were not influenced by whether or not they thought a food sample was organic.

### **Food for Thought: Organic vs. Conventional**

Stephanie Kerkaert (Department of Family Consumer Science)

Lindsay Dalluge (Department of Family Consumer Science)

Sara Holmberg (Department of Family Consumer Science)

Travis Meger (Department of Family Consumer Science)

*Susan Fredstrom, Faculty Mentor (Department of Family Consumer Science)*

*Joye Bond, Faculty Mentor (Department of Family Consumer Science)*

\*Recipient of Undergraduate Research Conference Small Grant

In the media, organic fruits and vegetables are portrayed as being superior to conventionally-produced foods in several aspects, including flavor. This study's objective was to determine if college students changed their perceptions regarding the flavor of a conventionally grown food after being falsely told it was organic, with the hypothesis that subjects would prefer samples believed to be organic. Taste panels were conducted over three consecutive days with 102 participants. All the celery, carrots, apples and bananas tested were purchased within the three days of testing. A first set of coded samples was offered, then a second plate, for which subjects were told the samples were organic. Subjects rated samples on a 9-point hedonic scale, where 1=dislike extremely and 9=like extremely. A survey of fruits and vegetable intake and attitudes regarding organic foods was also taken. Subjects rated all samples highly, but no difference in flavor preference was found when comparing conventional to "organic" carrots, celery, and apples. However, a significant ( $p=0.04$ ) difference was shown to exist between the samples of banana, with the perceived organic banana receiving a higher value for flavor. At this time it is not fully understood why the banana samples exhibited differences in flavor while the others did not. Further research will be needed to fully understand the relationship between perceptions of organic and conventional foods and perceived flavor differences.

### **Mapping Crime Locations on the Minnesota State University-Mankato Campus**

Ashley M. Keul (Department of Geography)

Chris P. Somage (Department of Geography)

*Forrest Wilkerson, Faculty Mentor (Department of Geography)*

\*Recipient of Minnesota State University, Mankato Foundation Grant

The Emergency Blue Light Phones are security boxes that allow a caller to directly contact Emergency Services. The goal of this project was to develop a better understanding of the distribution of crime on campus in relation to the Emergency Blue Light Phones. This project analyzed the current location and spatial coverage of Emergency Blue Light Phones on the MSU-Mankato campus to assess the adequacy of current coverage to serve the campus community. Standardized and accepted methods used in Geography and Geographic Information Systems (GIS) crime mapping were incorporated using data obtained from campus security, GPS, and a Digital Elevation Model. A viewshed analysis was performed to determine the visibility of Emergency Blue Light Phones and a database of security incidents was created and inserted into GIS mapping software. The ultimate goal is to improve campus safety and the visibility and awareness of Emergency Blue Light Phones on campus.



## **The Development and Characteristics of Collegiate Basketball Coaches' Coaching Philosophies**

Tony Vroman (Department of Human Performance)

*Cindra Kamphoff, Faculty Mentor (Department of Human Performance)*

Research indicates that outstanding coaches have well-developed coaching philosophies (Collins, Gould, Lauer, & Chung, 2009). In fact, Vealey (2005) argues that a coaching philosophy provides coaches meaning and direction, and allows coaches to develop a sense of purpose. She says that a philosophy should be a "how to manual" to guide a coaches' actions and decisions. Similarly, Lyle (2002) defines a coaching philosophy as beliefs that guide coaching actions. Although some research has suggested the importance of developing a coaching philosophy, few studies have examined how coaches develop their own coaching philosophy (Collins et al., 2009; Pratt & Eitzen; 1989; Wilcox & Trudel, 1998). Without a grasp on how these philosophies are developed, it becomes difficult to inform future coaches how to develop their own coaching philosophy. The purpose of this study was to determine the characteristics of collegiate coaches' philosophies, how their philosophies were developed, and how their philosophies have changed over time. In-depth semi-structured interviews were conducted with 10 male basketball coaches who coach at the collegiate level. The coaches were contacted by phone and/or email to arrange the interview. The interviews were transcribed verbatim and analyzed for reoccurring statements or ideas and developed into themes. Full results including the themes and practical implications from the study will be discussed.

## **Spirituality and Pediatric End-of-Life Care**

Janet Elizabeth Rother (School of Nursing)

*Jean Humphries, Faculty Mentor (School of Nursing)*

The purpose of this literature review was to determine the state of the science on the role of spirituality for families during the loss of a child. The literature review was conducted by using a collection of online research databases including the Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medline/PubMed and EbscoHOST. Keywords used to direct the search included: *spirituality*, *end-of-life*, *pediatrics*, and *palliative care*. Eleven articles were analyzed and synthesized. Findings from the review of literature concluded that the death of a child is a very challenging time for families and that spirituality plays a vital role in the bereavement process for many. In addition, nurses as a whole are a very spiritual population. However, the profession appears to lack a comprehensive approach to providing spiritual care to pediatric patients and their families at the end-of-life. Due to the fact that spirituality is so important to holistic care, the science of nursing demands further research on its impact in health care provision. More research is especially needed on diverse populations and specifics to the end-of-life process. The future of nursing would also benefit from professional education about pediatric end-of-life care, spirituality and its incorporation into practice for nursing staff.

### **Emotions Experienced After a Spontaneous Abortion**

Kelli Hogberg (School of Nursing)

Taryn Califano (School of Nursing)

*Jean Humphries, Faculty Mentor (School of Nursing)*

The purpose of this literature review was to determine what emotions are experienced and what support is available after the death of a nonviable fetus by both the patient and their significant other.

Methods: Articles were found by searching the CINAHL and ProQuest Psychology Journal databases. Key terms used for searching included *miscarriage*, and *spontaneous abortion* collaborated with *grief*, *emotions*, *support*, and *nursing support*.

Our findings were that most women and their significant other experience some type of grief reaction after losing a fetus. Studies indicated that a follow up appointment maybe beneficial to the patient and their significant other after they have been discharged from an inpatient unit. Grief is variable from patient to patient but the majority of evidence suggests that both males and females who have experienced a spontaneous abortion experience grief. Further research is needed to determine if follow up appointments, support groups, or other support services would benefit the majority of patients.

### **Latino and Somali Immigrant Social Adjustment and Mental Health in South Central Minnesota**

Ayan Duale (School of Nursing)

*Diane Witt, Faculty Mentor (School of Nursing)*

Ethnically diverse populations including Latino and African refugees and immigrants significantly increased between 1990 and 2004 in south central Minnesota. The purpose of this Ethnonursing research project is to complete a needs assessment of Latino and Somali refugees/immigrants in regard to social adjustment and mental health. Latino and Somali community members and gatekeepers/leaders were identified and interviewed to determine their perspective on social adjustment and mental health needs of these immigrant communities. Interviews with immigrant informants were carried out in small focus groups comprised of immigrant informants, the principle investigators and a culturally appropriate interpreter. Interviews were conducted utilizing a semi structured interview guide, audio taped, transcribed and translated into English. Demographic data was collected and compiled to get a demographic picture of the informants. Ethnonursing methodology is being used to analyze the qualitative data to determine patterns and themes. The study findings will be utilized for program development to help meet the mental health needs of immigrants in south central Minnesota. This project was carried out through the Open Door Health Center and was partially funded through the Blue Cross and Blue Shield of Minnesota Foundation.

## **Surveying Case Managers about Current Practices Regarding Foster Youth**

Jacy Kraayenbrink (Department of Psychology)

Michael Hamilton (Department of Psychology)

*Carlos J. Panahon, Faculty Mentor (Department of Psychology)*

*Laura Strunk, Faculty Mentor (Department of Social Work)*

This research was conducted to look at case workers and their current practices regarding foster youth. Foster youth are included in a vulnerable population that has limited access to school programs that would allow them to have a more well-rounded education. Therefore, it is important to examine the services case managers provide foster youth to overcome these obstacles and allow them to have a better education. A case manager works in various communities assisting adolescent wards of the state by providing advocacy, assessment, and a broad range of case management services to youth. These services include but are not limited to, developing service plans, transporting youth to various appointments, providing supervised visits to clients, attending court sessions, completing necessary reports, and providing referrals for services needed. The objectives of this research were to determine how frequently case workers are implementing after school social support programs for foster and post foster youth and how much they feel these programs are necessary. In addition, the necessity of doing more of an exhaustive post foster care check-up of foster youth by the case managers to ensure better transition from foster care was examined. The surveys were sent to case managers in Southern Minnesota that work with Foster Youth between that ages of 14 and 21. Descriptive and correlational analyses were conducted on all returned surveys. Results identified relative strengths and weaknesses of current services provided to foster youth. Recommendations to improve services for foster youth were provided.

## **Levels of Student Test Anxiety and Effort Put Into Succeeding**

Lauren Cardoni (Department of Psychology)

*Emily Stark, Faculty Mentor (Department of Psychology)*

Test anxiety is relevant to anyone that has faced a difficult exam, and while there are many different approaches to learning information and preparing for tests, the time put into preparing is most important. The current research seeks to understand connections between test anxiety and studying behavior. Participants in this experiment were asked a multitude of questions regarding their attitudes towards exams and the amount of time they spent studying, along with general personality questions. We expect that people who put more hours into studying for exams will consequently worry more about doing well on exams while people who worry less about doing well will study less. We also expect that women will study more and have more anxiety about doing well then males.

## **Treatment Integrity Reporting In School Psychology Journals**

Nicole E. Enfield (Department of Psychology)

Jessica M. Morales (Department of Psychology)

*Daniel D. Houlihan, Faculty Mentor (Department of Psychology)*

In order to truly know if a treatment is effective, researchers need to monitor the implementation of the treatment to ensure that each step is conducted correctly to be certain the treatment was the true cause of the study findings; this process is called treatment integrity. In this study, we reviewed articles to investigate whether treatment integrity was conducted on intervention studies, and if so whether it was recorded and published. We reviewed five School Psychology journals (Canadian Journal of School Psychology, Journal of School Psychology, School Psychology International, School Psychology Quarterly, and School Psychology Review) over the years of 1993-2009. We found that in the majority of the articles treatment integrity was not executed. This could pose a problem due to lack of certainty regarding experimental control and bias as to whether the treatment was the cause of the results of the study.

## **Examining Pre-service Consultation Training in NASP-Approved Graduate Programs in School Psychology**

Brittany A. Foster (Department of Psychology)

Isaiah F. Biesanz (Department of Psychology)

Jacy N. Kraayenbrink (Department of Psychology)

Patricia D. Hopkins (Department of Psychology)

Jessica A. Day (Department of Psychology)

*Carlos J. Panahon, Faculty Mentor (Department of Psychology)*

School consultation is a problem solving process in which a teacher seeks the help of a consultant regarding an academic or behavioral problem a student is exhibiting. The classroom teacher receives recommendations from the consultant pertaining to problems within the classroom. Consultation has been identified as a preferred activity by school psychology practitioners. However, several studies examining pre-service training in consultation have reported large percentages of practitioners as rating their graduate training as being less than adequate. Therefore, the objective of this study was to examine current consultation requirements within school psychology graduate training programs. All graduate programs in school psychology approved by the National Association of School Psychologists were evaluated. Information pertaining to the number of courses and number of practicum hours required by each program was collected. Data were analyzed by the type of degree offered and the program's geographic region. The results provide current information pertaining to pre-service consultation training. The results of this evaluation will be beneficial to undergraduate students seeking information regarding graduate training in school psychology. In addition, graduate programs in school psychology may use this information to improve the quality of training their students receive in consultation.

### **Surveying School Psychologists about Pre-service Training in Response to Intervention**

Patricia D. Hopkins (Department of Psychology)

Carissa A. Borchardt (Department of Psychology)

Michael A. Hamilton (Department of Psychology)

Jacy N. Kraayenbrink (Department of Psychology)

Aimee L. Kotten (Department of Psychology)

*Carlos J. Panahon, Faculty Mentor, (Department of Psychology)*

*Alexandra Hilt-Panahon, Faculty Mentor (Department of Special Education)*

\*Recipient of Undergraduate Research Conference Large Grant

The objective of this project was to obtain detailed information regarding the pre-service training of school psychologists pertaining to Response to Intervention (RTI). RTI is a three tiered model for providing intervention that has recently been identified as an alternative method for identifying children with learning disabilities. Surveys were sent to a nationally stratified random sample of school psychology practitioners. School psychologists were asked to provide information related to their training within the area of RTI. Descriptive and correlation analyses were conducted on all returned surveys. Results from this project were synthesized to determine if school psychologists are adequately trained. In addition, relative strengths and weaknesses of current training practices were identified. The results provide information pertaining to current pre-service RTI training; reported levels of satisfaction with pre-service training, as well as actual time spent providing RTI services. The findings highlight areas that need to be addressed to improve the quality of pre-service training of school psychologists. Therefore, the results may be used to inform graduate training programs what skills school psychologists need further training in to be better prepared to work in today's schools.

### **Surveying Special Education Teachers about Pre-service Training in Response to Intervention**

Aimee L. Kotten (Department of Psychology)

Jessica A. Day (Department of Psychology)

Isaiah F. Biesanz (Department of Psychology)

Brittany A. Foster (Department of Psychology)

Carissa A. Borchardt (Department of Psychology)

*Carlos J. Panahon, Faculty Mentor (Department of Psychology)*

*Alexandra Hilt-Panahon, Faculty Mentor (Department of Special Education)*

\*Recipient of Undergraduate Research Conference Small Grant

Response to intervention (RTI) is an alternative method school districts may now use to identify children with learning disorders. In the RTI model, a student with academic difficulties is provided one or more empirically supported interventions. The student's academic performance is monitored to see if the student progresses. If the student's performance does not improve, then the failure to respond may be viewed as evidence of an underlying learning disability. The objective of the study was to determine whether special education teachers are receiving adequate training regarding RTI services. A survey was mailed to a nationally stratified random sample of 1000 special education teachers in the United States. The survey contained questions that examined the respondents' satisfaction with the pre-service training in RTI and the daily activities implemented to deliver RTI services. Descriptive and correlation analyses were conducted on all returned surveys. The results highlight the strengths and weaknesses in the quality of pre-service RTI training of special education teachers. The findings also identify the daily RTI activities of special education teachers as well as the barriers they face administering these services. The findings may be used to inform teacher training programs about the skill areas that need further development so special education teachers can be better prepared to work in schools today.

### **Study Habits and Attitudes study**

Amanda Cyr (Department of Psychology)

*Emily Stark, Faculty Mentor (Department of Psychology)*

Study habits are something we can use to measure success in school. By learning how college students study and their attitudes toward studying we can help not only their success but the success of the school. This study assesses how students' text anxiety or relates to how they respond to positively or negatively framed material about studying. Participants in this study are told they will take a test and that they have the opportunity to study for the test. They were told either by studying the words it would give them the opportunity to become more familiar with the words and be successful in the test (positive frame) or if they do not study the words they will not have an opportunity to be successful in the test (negative frame). After either studying or choosing not to they took the test and were then given an attitudes survey to fill out about how they felt about tests and classes. Results will examine whether the frame of the studying message and participants' text anxiety related to whether and how long participants studied.

### **Propensity to Trust and Trusting Behaviors in Team Decision-Making**

Elizabeth Brielmaier (Department of Psychology)

*Andi Lassiter, Faculty Mentor (Department of Psychology)*

Previous researchers have examined how newly formed team members come to trust one another. Swift trust, as it is known, has been examined in both theoretical and empirical research studies. However, existing research has not addressed how individual's propensity to trust influences actual trusting behavior in work teams. Using undergraduate participants, data were collected from two-person teams who worked together on a decision-making task. We expected to find that an individual's propensity to trust resulted in more trusting behaviors in swift trust decision-making situations, and that trust resulted in higher levels of team effectiveness. Results will add to what is known about trust and how it influences teams in the workplace.

## **Decision Making and Personality**

Margaret Moe (Department of Psychology)

Natasha Olson (Department of Psychology)

*Emily Stark, Faculty Mentor (Department of Psychology)*

The current research examines how personality traits such as rational/experiential processing and emotionality (positive and negative) influence how people respond to framed options. Rational processing is a logical and rational way of making decisions; whereas, experiential processing is an automatic and gut feeling approach to making decisions (Stark et al., unpublished manuscript, Epstein et al. 1996). Previous research has shown that whether options are framed as losses or as gains influences choices, and that this can change decisions that are made when options are risky or uncertain. Specifically, individuals tend to prefer certain options when they are focused on gains, but prefer uncertain options when they are focused on losses (Tversky & Kahneman, 1981; Kuhberger, 1998). To examine decision making in accordance with personality traits over 100 college students were given a packet of scenarios, which they were instructed to write and rate how they feel about a scenario and two consequential program plans. The scenario packet also includes measures of logical and intuitive processing and level of emotionality. The scenario packet was used to measure decisions in response to gain-framed and loss-framed scenarios. Following the scenario packet the participants were given a personality inventory to assess personality traits. The data from the decision making packets was compared to the participants' personality traits. We expect to find that participants who rely more on intuitive processing compared to logical processing, and who show greater levels of emotionality, are more influenced by the frame of the option.

## **Stigmatic Views for Mental Health Disorders in a College Population 2**

Patricia D. Hopkins (Department of Psychology)

Carissa A. Borchardt (Department of Psychology)

Melissa A. Lenz (Department of Psychology)

*Barry J. Ries, Faculty Mentor (Department of Psychology)*

Mental health stigma currently is a hindrance to individuals seeking treatment. Stigma can be defined as an individual trait that is viewed negatively by society. Mental health stigma is associated with psychological disorders and the negative stereotypes that go along with the disorders. There have been few studies on stigma related to psychological disorders beyond major depressive disorder. Numerous studies have compared depression and schizophrenia. These studies have found similar levels of self reported stigma associated with the two disorders. However, these studies neglected to determine if differentiation occurs between disorders. The purpose of this study is to further investigate stigma expressed by a college population related to mental health disorders. More specifically, it will compare stigmatic views for depression, schizophrenia, anxiety, and mania. Researchers will attempt to determine if symptoms of these separate disorders are confused with other mental health conditions or do individuals appreciate their ideographic nature. The researchers will give each participant a vignette that describes a person with symptoms of the disorder. After participants read the narrative, they will complete a questionnaire indicating their attitudes towards the person in the vignette. In addition, a control group will read a vignette on obesity to determine if mental health stigma is different than other forms of stigma. It is hypothesized that participants will hold the same stigmatic views of an individual regardless of psychological disorder symptomatology. It is hoped that with continued research and study, therapists and patients may find ways to reduce or eliminate stigma associated with psychological disorders.

### **Making the History of Psychology a Story in South Central Minnesota**

Jessica Christenson (Department of Psychology)

Rachel Kruger (Department of Psychology)

Jenna Helget (Department of Psychology)

Amanda Vonbergen (Department of Psychology)

*Andi Lassiter, Faculty Mentor (Department of Psychology)*

There is a need within the field of psychology to conduct more historical research (Chamberlin, 2010). It is important for psychologists to advocate for and appreciate the history of the field and understand how the past can influence the future. We also should work to better inform the public about the treatment of mental illness, as it was in the past and is in the present. South Central Minnesota hosts the state's only museum dedicated to the history of the treatment of the mentally ill. Few people actually know about this museum. Our research examined what visitors to the Saint Peter Regional Treatment Center museum would like to see in future exhibits and displays at the museum. Visitors to the museum completed brief surveys regarding what psychologically-relevant information they were interested in seeing in displays at the museum. Further, participants were asked their recommendations regarding public promotion of the facility. The goal of this project is to help museum staff continue to promote the field of psychology in the region.

### **Revisiting the Assessment of Punitiveness amongst College Students: A comparison of law enforcement majors with corrections majors.**

Briana Threatt (Department of Sociology & Corrections)

*Sherrise Truesdale-Moore, Faculty Mentor (Department of Sociology & Corrections)*

This study had scientific and practical significance. Scientifically, this research examined the attitudes of Law Enforcement and Correction majors of their punitiveness towards juvenile offenders. Practically, studying the attitudes of criminal justice and correction majors may reflect an underlying dimension of how future practitioners may impact juvenile justice and delinquency policies. With the high violent crimes among juveniles in the United States, which ultimately have generated punitive policies, such as juvenile transfer waiver laws, it is crucial that scholars investigate factors that may influence how future practitioners may impact the lives of our juveniles. From this study I hoped to find out whether or not higher education within corrections and law enforcement discipline, had a relationship to biases held within practitioners that ultimately are work in the field. The participants of the study were junior and senior corrections and law enforcement majors enrolled at Minnesota State University, Mankato randomly selected for participation by the courses in which they were enrolled. A questionnaire was used to assess their punitiveness toward juveniles. Participants were asked to indicate the number that best represented how they felt about each of the given statements based on a likert scale. Higher scores indicated greater amounts of punitiveness toward juvenile policies and offenders.



## Art, Art History and Music

### **Love and War: Rubens and the Fusion of Venus, a Figure of Love, into a Personification of Peace**

Margo Steck (Department of Art History)

*Curt Germundson, Faculty Mentor (Department of Art)*

\*Recipient of Minnesota State University, Mankato Foundation Grant

### **Crossing the Divide between Art and Craft**

Kristin J. Harsma (Department of Art)

*Curt Germundson, Faculty Mentor (Department of Art)*

### **Patrons and Pilgrims of Sanchi: A Universal Site for a Universal Audience**

Amber E. Phillips (Department of Art History)

*Alisa Eimen, Faculty Mentor (Department of Art History)*

### **A New Approach to Music Education**

Benjamin Wagner (Department of Music)

Samantha McCune (Department of Music)

*Linda Duckett, Faculty Mentor (Department of Music)*

### **A Culmination of East and West: The Historical Interaction of the East and West Illustrated Through the Merge of Nigerian Ankara Inspired Textile with the Fashion Trends of 1441, 1863, 1960, and 2009**

Oluwabusola Duroshola (Department of Art)

*Erik Waterkotte, Faculty Mentor (Department of Art)*

*Mathew Willemsen, Faculty Mentor (Department of Art)*

\*Recipient of Undergraduate Research Conference Large Grant

## **Love and War: Rubens and the Fusion of Venus, a Figure of Love, into a Personification of Peace**

Margo Steck (Department of Art History)

*Curt Germundson, Faculty Mentor (Department of Art)*

\*Recipient of Minnesota State University, Mankato Foundation Grant

For centuries artists have been making political statements through their art. Baroque painter and unofficial Belgian Ambassador Peter Paul Rubens utilized mythology and allegories in his paintings as a means of conveying his thoughts and strong feelings in regards to the underlying cruelty and violence of war along with the eminence of peace. By tracking Rubens' use of the goddess Venus from a figure of love into the personification of peace, this paper will show how Rubens worked politics into his paintings and gave the Venus figure a significance that she does not typically have in art. Although the times have changed since 1640, the year Rubens died, his themes still remain prevalent in today's society. These themes include the importance of peace and how it brings prosperity and general happiness to all who exercise it, and the disorder associated with war; the destroyer of innocence, harmony and concord. Through the use of Venus he makes his most prevalent statement—without love, one cannot attain peace. By reviewing letters Rubens wrote, scholarly books and articles, evaluating his art first hand and also attending a Rubens conference in Antwerp, my paper opens up a new discussion on how Rubens presents Venus, going beyond the usual focus on his robust and fleshy figures, leading to a deeper investigation of his messages and presenting a fresh way of viewing the political role of allegories.

## **Crossing the Divide between Art and Craft**

Kristin J. Harsma (Department of Art)

*Curt Germundson, Faculty Mentor (Department of Art)*

Throughout history, various qualities of art have gone in and out of fashion, works declared high art being considered most important. However, there has always been a hierarchy of not only subjects of art but also of media used to create art. Some media, such as fibers, stained glass, mosaics, and even ceramics, are considered on the lower end of this scale, due to their associations with certain processes and function. I argue that it is illegitimate to maintain a hierarchy based on processes and function, for all works of art require some knowledge and skill of one's craft, whether it is painting, sculpting, printmaking, photography, mosaics, ceramics, fibers or any other medium. The many debates over art and so-called craft date back as far as philosophers of Ancient Greece and show the apparent need to clearly define the two, to make everything distinctly fit either art or craft. There have been many artistic movements that have questioned this distinction. By exploring the debate around art and craft through the examination of the works of relevant philosophers, artists, and artistic periods I argue that this distinction needs to be refined, thus eliminating the negative connotation of "craft."

## **Patrons and Pilgrims of Sanchi: A Universal Site for a Universal Audience**

Amber E. Phillips (Department of Art History)

*Alisa Eimen, Faculty Mentor (Department of Art History)*

This paper focused on the Great Stupa at Sanchi as a central pilgrimage site with universal imagery that would have meaning not only to Buddhist pilgrims in India, but also to the Hindu pilgrims visiting Sanchi and other similar sites. It dealt with the significance of pilgrimage within India and looked at the tolerant coexistence of Hindu and Buddhist followers in 1<sup>st</sup> century India. It is imperative to how we perceive the current climate of India. Many people believe that current intolerance is founded on a past of intolerance. This research sought to disprove that idea and to give a better history of India's interrelations. In approximately the fifth century BCE, Stupas began as earthen mounds in which relics from the Buddha's cremated remains were placed. Over time, stupas developed into much more symbolic sites rather than actual reliquaries. Stupas are large, hemispherical mounds surrounded by railings, which guide the worshiper around the structure. The practice of ritual circumambulation is enacted in remembrance of the Buddha and in meditation on his teachings. The four gateways and railings surrounding the stupa are covered in relief carvings that depict stories of his many lives, some of which are similar to Aesop's tales. I examined the structure at Sanchi with special interest in the relief carvings on the gateways that depict Buddhist stories along with the Hindu influences on the imagery. I also looked carefully at inscriptions, which indicated patronage and pilgrimage in order to show cross-religious relations in ancient India.

## **A New Approach to Music Education**

Benjamin Wagner (Department of Music)

Samantha McCune (Department of Music)

*Linda Duckett, Faculty Mentor (Department of Music)*

The purpose of this abstract is to help bring a new way of teaching basic musical terms to a fourth through eighth grade classroom setting through the excitement of an action television show. The basis of our educational development idea is to bring to educators a new curriculum to use in their classrooms to help develop fundamental musical ideas. To fulfill this goal we scripted eight episodes of our action television show entitled, *The Theory Rangers*, in which the rangers use basic musical ideas to solve puzzles and save the day. For this project we have utilized a lively cast of thirty-six theatre, dance and music majors. Each episode also includes full orchestral music performed by MSU musicians demonstrating famous orchestral music heard often-in everyday life. Each episode comes with a full study guide and lesson plans to use throughout the episode or as an independent study guide. Each episode follows the Minnesota Academic Standards for teaching forth through eighth general music and has been viewed and approved by schools throughout the state.

**A Culmination of East and West: The Historical Interaction of the East and West Illustrated Through the Merge of Nigerian Ankara Inspired Textile with the Fashion Trends of 1441, 1863, 1960, and 2009**

Oluwabusola Duroshola (Department of Art)

*Erik Waterkotte, Faculty Mentor (Department of Art)*

*Mathew Willemsen, Faculty Mentor (Department of Art)*

\*Recipient of Undergraduate Research Conference Large Grant

This abstract examined the historical impact of the East and West through the juxtaposition of Nigerian Ankara inspired textile and popular Western fashion trends of 1441, 1863, 1960 and 2009. Through this juxtaposition, the work represents America as the merging ground of two historically related cultures. Each historical date studied within this research project represent a major historical happening between the East and the West. They include; the Atlantic Slave trade of 1441, the Emancipation Proclamation declaration of 1863, the civil rights movement of the 1960s, and the inauguration of the first African-American president of the United States of America of 2009. Two major research strategies were used; (1) an extensive research on various colors, patterns, and materials used to produce Ankara and (2) the examination of popular fashion trends of the West. This research project serves as a visually representation of the historical interaction between the East and West, illustrated through the merge of Nigerian Ankara inspired textile with the fashion trend of 1441, 1863, 1960 and 2009. The product of this unification is the representation of the historical growth between two cultures.

## Social Work

### **1 - Why are multiple placements for children in foster care high in a southern Minnesota county and what are some strategies of limiting multiple placements?**

Sheryl Larsen (Department of Social Work)

*Laura Strunk, Faculty Mentor (Department of Social Work)*

### **2 - How does society view child protection services, past and present?**

Hallie Anderson (Department of Social Work)

*Laura Strunk, Faculty Mentor (Department of Social Work)*

### **3 - Co-occurring Disorders – Treatment success in Chemical Dependency**

Amanda Greiner (Department of Social Work)

*Laura Strunk, Faculty Mentor, (Department of Social Work)*

### **4 - A Comparative Analysis of Clients Serviced between the Salvation Army and Blue Earth County**

Emily Shopek (Department of Social Work)

*Laura Strunk, Faculty Mentor, (Department of Social Work)*

### **5 - Are Home and Community Based Providers contracted with Blue Earth County Public Health satisfied with communication between their agency and BEC PH?**

Samantha Barnett (Department of Social Work)

*Laura Strunk, Faculty Mentor (Department of Social Work)*

### **6 - A Research of Adoptive Families' Preferences and Finding Homes for Older Children**

Bethany Jobe (Department of Social Work)

*Laura Strunk, Faculty Mentor (Department of Social Work)*

### **7 - How does an intervention for troubled adolescent girls affect their self esteem?**

Samantha Falck (Department of Social Work)

*Laura Strunk, Faculty Mentor (Department of Social Work)*

### **8 - Moving Clients from One Funding Stream to Another**

Alicia Thorn (Department of Social Work)

*Laura Strunk (Department of Social Work)*

### **9 - A Comparison of Self Esteem**

Kim Colvin (Department of Social Work)

*Laura Strunk, Faculty Mentor (Department of Social Work)*

### **10 - Comparative Analysis on Bereavement Services**

Jennifer Sosebee (Department of Social Work)

*Christine Black-Hughes, Faculty Mentor (Department of Social Work)*

### **11 - Advanced Care Planning: Preferences for Care at End of Life**

Maria Ruschmeyer (Department of Social Work)

*Christine Black-Hughes, Faculty Mentor (Department of Social Work)*

**12 - Exploring the possibility of Social Workers as part of Hospitalist Teams at Immanuel-St. Joseph's Hospital**

Lacy A. Weidert (Department of Social Work)

*Christine Black-Hughes, Faculty Mentor (Department of Social Work)*

**13 - Evaluating the effectiveness of the Second Step Violence Prevention Curriculum in the 5<sup>th</sup> Grade at Lake Crystal Wellcome Memorial Elementary School**

Kristyn Vinkemeier (Department of Social Work)

*Christine Black-Hughes, Faculty Mentor (Department of Social Work)*

**14 - Coordination of an Adult Protection Team**

Amber Koester (Department of Social Work)

*Christine Black-Hughes, Faculty Mentor (Department of Social Work)*

**15 - Supervised Visitation Center for Human Services of Faribault and Martin Counties**

Alyssa Sanchez (Department of Social Work)

*Christine Black-Hughes, Faculty Mentor (Department of Social Work)*

**16 - Advanced Care Planning: A Community Assessment and Outreach Project**

Brenda Karch (Department of Social Work)

*Christine Black-Hughes, Faculty Mentor (Department of Social Work)*

**17 - A review of referral results to the Interagency Early Intervention Committee**

Heather Nielsen (Department of Social Work)

*Christine Black-Hughes, Faculty Mentor (Department of Social Work)*

**18 - Evaluating Social and Emotional Learning in High School Students with Emotional or Behavioral Disorders**

Ryan Barnhart (Department of Social Work)

*Laura Strunk, Faculty Mentor (Department of Social Work)*

**19 - How Crack-Cocaine Use During Pregnancy Affects Newborns Immediately After Birth**

Caylin C. Cedergren (Department of Social Work)

*Laura L. Strunk, Faculty Mentor (Department of Social Work)*

**20 - Twelve Week Spirituality Curriculum Implementation**

Kristopher Jaeger (Department of Social Work)

*Christine Black-Hughes, Faculty Mentor (Department of Social Work)*

**21 - The Effectiveness of Monitored Antabuse Treatment**

Katie Meuwissen (Department of Social Work)

*Laura Strunk, Faculty Mentor (Department of Social Work)*

**22 - Developmental Disability waiver satisfaction survey done at the Southern Minnesota County**

Hyojin Lee (Department of Social Work)

*Laura Strunk, Faculty Mentor (Department of Social Work)*

**23 - The effect of teaching study skills and strategies to children with ADD/ADHD**

Amber L. Koziolk (Department of Social Work)

*Laura L. Strunk, Faculty Mentor (Department of Social Work)*

**24 - The Impact of 'Youth First Community of Promise' and After School Programming on Young People**

Ashley Skaalerud (Department of Social Work)

*Laura Strunk, Faculty Mentor (Department of Social Work)*

**Why are multiple placements for children in foster care high in a southern Minnesota county and what are some strategies of limiting multiple placements?**

Sheryl Larsen (Department of Social Work)

*Laura Strunk, Faculty Mentor (Department of Social Work)*

Why are multiple placements for children in foster care high in a southern Minnesota county and what are some strategies of limiting multiple placements? Multiple placements, also referred to as placement instability or placement disruption, is when more than two placements occur in one year while a child is placed in foster care. Research has shown several ways to prevent multiple placements from happening include, but are not limited to, placing children with kin, children, parents, and foster parents receiving more services, involving children and parents in case planning, and workers having more frequent contact with birth parents. Research has been conducted by interviewing foster parents, researching scholarly journals and reports, and collecting data regarding multiple placements in several counties. Research is in progress and the results will be available at a later date.

**How does society view child protection services, past and present?**

Hallie Anderson (Department of Social Work)

*Laura Strunk, Faculty Mentor (Department of Social Work)*

This research project discusses how the community views child protection services. It is important for clients and community members to understand the purpose and goal of child protection assessments and on-going child protection services. Contrary to popular belief, the primary goal of child protection is to ensure the safety of children, not to take children away from their parents/guardians. This research project will explore the past and present views of child protection services in southern Minnesota counties. The history of child protection services will also be researched to see if there is supportive evidence as to why there may be a negative connotation of services. This research project is in process and the results will be available at a later date. The findings regarding this research project are important because human services should be concerned about society's views and perspectives regarding the services they provide. It is beneficial for the community to accurately understand what child protection does and what it offer to families.



### **Co-occurring Disorders – Treatment success in Chemical Dependency**

Amanda Greiner (Department of Social Work)

*Laura Strunk, Faculty Mentor, (Department of Social Work)*

Based on several studies, it has been shown that individuals experiencing both a mental health and chemical dependency diagnosis have a better chance at a successful recovery if both diagnoses are treated simultaneously. To test this, 50 inpatient client charts from a local chemical dependency treatment center were reviewed to determine whether or not individuals with co-occurring disorders were less successful than those with only a chemical dependency diagnosis. Different variables such as initial risk scores and subsequent discharge scores; presence of a mental health diagnosis; voluntary or court ordered treatment; discharge status; etc. were compared to determine if results were congruent with previous studies. Results and conclusion not available at time of submission.

### **A Comparative Analysis of Clients Serviced between the Salvation Army and Blue Earth County**

Emily Shopek (Department of Social Work)

*Laura Strunk, Faculty Mentor, (Department of Social Work)*

A comparative analysis of clients serviced by the Salvation Army and Blue Earth County will be compared and examined. Statistics and records will be obtained from The Salvation Army and entered into the Service Point system in order to develop annual reports. These reports will then be studied and compared with Blue Earth County's records of services provided. This research is anticipating that The Salvation Army will serve a higher percentage of homeless, middle-aged, white men compared to Blue Earth County Services. This research project is in its beginning stages and the results will be forthcoming.

**Are Home and Community Based Providers contracted with Blue Earth County Public Health satisfied with communication between their agency and BEC PH?**

Samantha Barnett (Department of Social Work)

*Laura Strunk, Faculty Mentor (Department of Social Work)*

Provider satisfaction in home care agencies, assisted living agencies, and supply and equipment agencies is beneficial for Blue Earth County Public Health (BEC PH) to fully understand contracted agency needs. The purpose of this research is to determine satisfaction of Home and Community Based Services (HCBS) providers with the communication between their agency and BEC PH. Throughout research, provider satisfaction is expected to be high. A communication survey for providers contracted with BEC PH was written and administered to HCBS providers including home care agencies, assisted living agencies, and supply and equipment agencies. Data will be collected and interpreted to determine provider satisfaction with communication between their agency and BEC PH. The satisfaction level of HCBS providers is vital for BEC PH in order to be more effective in communication as a public health department. The research is in progress and the results will be available by April, 2010. The results will be beneficial to both BEC PH and the providers by improving communication in needed areas.

**A Research of Adoptive Families' Preferences and Finding Homes for Older Children**

Bethany Jobe (Department of Social Work)

*Laura Strunk, Faculty Mentor (Department of Social Work)*

The preference of children for adoptive families compared to finding permanent homes for older foster children. The adoptive families' preference of children will not be significantly linked with finding permanency for older children. Use Adopt America Network and Adopt Us Kids to find adoptive parents and document their preferences of children. Using the same sources, find out the ages of waiting children and categorize them in two sections (infant to 11 year olds and 12 to 17 year olds). Find journal articles for adoptive families' preferences and older waiting children. The research is in process and the results will be ready in time for the conference. The results of this research can show whether or not older waiting children are discriminated against (because of their age) by the preferences of adoptive families. The research is in process and the results will be ready in time for the conference.

### **How does an intervention for troubled adolescent girls affect their self esteem?**

Samantha Falck (Department of Social Work)

*Laura Strunk, Faculty Mentor (Department of Social Work)*

The Girls Group is an intervention for troubled girls who have different experiences that brought them into juvenile justice or juvenile protection programs. The group is designed to bring them new experiences, meet basic human needs such as affection and attention, and teach them new skills. If the adolescences participate in the Girls Group, then they should have a higher self-esteem than they did before participating in the group. Girls that completed the group or are currently participating in it were given a survey on self esteem. The responses were measured by using a likert scale. The results determined whether or not the group has an affect on their self esteem. The results are not available yet as this the research project is still in progress.

### **Moving Clients from One Funding Stream to Another**

Alicia Thorn (Department of Social Work)

*Laura Strunk (Department of Social Work)*

The moving of eligible clients from one funding stream to another, and reorganizing the social worker's involvement in the cases to the eligible clients. This research will show if this new way of doing things going to be more productive then what has been done in the past, and if it is should the other counties in Minnesota follow though and do it to. Making the social worker's case load larger and putting more of the responsibility on the clients who are able to be more independent and do not need a social worker other than once or twice a year for case management going to work. Clients may not understand why things have to change, but with explanation and with the help of the social worker it will be understood. Research from the state as well as letter for the legislature that was done a few years ago first addressing this issues will be used. The results are TBD.

### **A Comparison of Self Esteem**

Kim Colvin (Department of Social Work)

*Laura Strunk, Faculty Mentor (Department of Social Work)*

This research project involves learning about the self-esteem difference in sixth and seventh grade students and the correlation to adjustment as junior high students. It is important to be aware of the students self esteem to improve their junior high school experience. There will be a noticeable difference in the results between the sixth and seventh grade self esteem surveys/questionnaires. The seventh grade students will have lower scores suggesting lower self-esteem. The sixth and seventh grade students will be administered the Rosenberg's Self Esteem Scale, respectively. With the exception of identifying the grade level, the surveys/questionnaires will be anonymous. Comparisons will be made of the results through graphing. This research is in progress and will be ready by the Undergraduate Research Conference in the beginning of April 2010. This research is being conducted to give the agency (school) an idea of the self-esteem their sixth and seventh grade students have. This research may show the school that it needs to implement self-esteem programs, or add self-esteem lessons and discussions as a part of their curriculum. This research is in progress and therefore, no conclusions have been pronounced.

### **Comparative Analysis on Bereavement Services**

Jennifer Sosebee (Department of Social Work)

*Christine Black-Hughes, Faculty Mentor (Department of Social Work)*

Bereavement services are an important part in Hospice care. A comparative analysis of bereavement practices of Fairmont Medical Center's Hospice and new research on bereavement will be compared. This research project proposes a conceptual model which allows one to understand and explain differences and similarities between the traditional approach and newer models or alternate approaches towards death and bereavement. An extensive review of the literature will be conducted through articles, journals, books, internet online searches and looking through bereavement records.

### **Advanced Care Planning: Preferences for Care at End of Life**

Maria Ruschmeyer (Department of Social Work)

*Christine Black-Hughes, Faculty Mentor (Department of Social Work)*

Advance care planning is important for everyone and is underused within the medical system. The purpose of this study is to assess the knowledge of advance care planning in the New Ulm Medical Center community and research the benefits of advance care planning at end of life.

Community knowledge of advance care planning will be assessed through interviews with patients at the New Ulm Medical Center clinic. Participants were asked about advanced care planning and some demographic factors with all data collected anonymously. Interviews were done with hospice patients about the process of advance care planning and their choices regarding advance care planning and their decision to become part of hospice.

### **Exploring the possibility of Social Workers as part of Hospitalist Teams at Immanuel-St. Joseph's Hospital**

Lacy A. Weidert (Department of Social Work)

*Christine Black-Hughes, Faculty Mentor (Department of Social Work)*

Hospitalist teams are a special team in the hospital setting designed for managing patient care. A hospitalist is a physician who specializes in caring for patients during their stay at the hospital. The hospitalist team is made up of a licensed physician assistant (P.A.-C.) and a registered nurse (R.N.) as a care coordinator. Currently, Immanuel-St. Joseph's Hospital is exploring the possibility of adding a social worker to each hospitalist team. The purpose of this study is to explore the idea of adding a social worker to the hospitalist team. This will be an analytical review of the literature and of current practices of hospitals similar to Immanuel-St. Joseph's Hospital. This study will compare and contrast the similarities and differences of the findings.

## **Evaluating the effectiveness of the Second Step Violence Prevention Curriculum in the 5<sup>th</sup> Grade at Lake Crystal Wellcome Memorial Elementary School**

Kristyn Vinkemeier (Department of Social Work)

*Christine Black-Hughes, Faculty Mentor (Department of Social Work)*

Bullying is a nation-wide problem that negatively affects not only its victims, but also the bystanders who witness bullying and the bullies themselves. The core of the intervention will be a four-week period during which several activities are planned with each of the two classes based on the Second Step Violence Prevention Curriculum. An experimental pre-assessment/post-assessment design with a control will be used. The sample will consist of 56 students (18 control) from the 5<sup>th</sup> grade classrooms at Lake Crystal Wellcome Memorial Elementary School. The intervention group will meet one time per week for 45 minutes for four weeks. Data will be collected using the same assessment before the intervention, as well as after the intervention.

## **Coordination of an Adult Protection Team**

Amber Koester (Department of Social Work)

*Christine Black-Hughes, Faculty Mentor (Department of Social Work)*

This research project is the development and implementation of a multidisciplinary Adult Protection Team initial meeting for McLeod County as well as setting up a curriculum. This project is important because it allows several agencies to work together to coordinate services for vulnerable adults. Is there a commonality found in the use of an Adult Protection Team or Adult Protection Unit within random county agencies located in Minnesota? The methods consist of contacting several other agencies that are known to have Adult Protection Teams in which the contact person was asked several questions regarding these teams. There are also agencies with Adult Protection workers and I hope to acquire information from them as well. I will also be completing a literature review regarding this project. Of the agencies that were contacted they either had the Adult Protection Team or an Adult Protection Unit/worker. Of those agencies with an Adult Protection Team some were only able to meet when there were cases to discuss. One agency does meet on a regular basis. The results do seem to concur with the initial hypothesis. There does seem to be a commonality among the interviewed county agencies of having either an Adult Protection Team or an Adult Protection Unit/worker. The results show that there is adult protection to some extent in every county agency that was contacted. People should be interested in these findings because every agency has the due concern for the issue of vulnerable adults and protecting their rights.

### **Supervised Visitation Center for Human Services of Faribault and Martin Counties**

Alyssa Sanchez (Department of Social Work)

*Christine Black-Hughes, Faculty Mentor (Department of Social Work)*

This research project is important for Martin and Faribault County. The goal of this research project was to find a location for families in these counties to be able to visit with their children in an environment that is safe for their children. This project will let children physically unite with their parents and build relationships. The resources to facilitate supervised visitations are available and need to be coordinated and implemented. A list was developed of locations for visits and volunteers through the use of flyers and personal contact with local churches and organizations. Then arranged for an organization to continue to facilitate this service.

### **Advanced Care Planning: A Community Assessment and Outreach Project**

Brenda Karch (Department of Social Work)

*Christine Black-Hughes, Faculty Mentor (Department of Social Work)*

Advanced care planning gives a “voice” to someone when they can no longer speak for themselves and allows them to plan for and express their wishes about future care. Advanced care planning allows them to express choices, personal concerns, values and spiritual beliefs so that their wishes are known. Someone’s wishes can be whatever they want them to be, from aggressive medical procedures to care that keeps them comfortable. Using an advance care plan can relieve family and caregivers of the stress of guessing what kind of care they want at the end of life. The purpose of this cross-sectional study was to assess the knowledge regarding advanced care planning among the New Ulm Medical Center clinical patients. This study was also used to educate the community about advanced care planning. Patients at the New Ulm Medical Center Clinic were asked three questions and their responses were measured using a nominal scale.

## **A review of referral results to the Interagency Early Intervention Committee**

Heather Nielsen (Department of Social Work)

*Christine Black-Hughes, Faculty Mentor (Department of Social Work)*

In Minnesota, children ages birth to three with developmental delays, disabilities, or certain diagnosed conditions are eligible for services in their home, child care setting, or school (Minnesota Department of Health, 2008). In addition to referrals from Child Protection, the Interagency Early Intervention Committee (IEIC) receives referrals from several other sources, such as medical providers, Follow Along program, Early Childhood Family Education, etc. The problem is that once the referral is made, the referral source does not hear back from IEIC about the services that are provided to the child or family (if any). It would be beneficial for service providers to collaborate with IEIC to enhance services and ensure that there is no duplication of services. For the purposes of this paper, the results of referrals to Sibley County IEIC were examined and a comparison between referral source and the response by IEIC were made by utilizing the research method of records review.

## **Evaluating Social and Emotional Learning in High School Students with Emotional or Behavioral Disorders**

Ryan Barnhart (Department of Social Work)

*Laura Strunk, Faculty Mentor (Department of Social Work)*

A group of six high school students with an emotional or behavioral disorder were assembled once a week for six weeks and studied social emotional learning near Mankato, Minnesota. Social emotional learning is a school based systematic process in which five competencies are taught to students, including self awareness, social awareness, self management, relationship skills and responsible decision making. This research examined whether a social emotional learning curriculum improved school attendance and decreased missing assignments. The curriculum used is a program called School-Connect, which “applies the latest research in emotional intelligence, positive psychology, prevention, conflict resolution, and character education.” The students were also given a pre-test and post-test survey to be compared using a pair sample t-test to evaluate social emotional learning changes. It is estimated that the students will make significant improvement in their school attendance, a decrease in their missing assignments and an increased in social emotional learning skills shown through the pre-test and post-test process. Research is currently in progress and results, discussion and conclusion(s) are to be determined.



## **How Crack-Cocaine Use During Pregnancy Affects Newborns Immediately After Birth**

Caylin C. Cedergren (Department of Social Work)

*Laura L. Strunk, Faculty Mentor (Department of Social Work)*

Studies have shown that crack-cocaine use during pregnancy can cause many harmful effects on a newborn baby. Many of these effects can be seen immediately after birth. Some hospitals perform meconium drug screens on newborn infants if there is suspicion of the mother using drugs during her pregnancy. This test reveals if certain drugs are in the newborn's system. Immanuel St. Joseph's Hospital has had meconium drug screens come back positive for crack-cocaine in the past. However, some of the staff was not familiar with specific physical symptoms a newborn would display if positive for crack-cocaine. This research project is being conducted to find out more information about the physical effects crack-cocaine has on newborns. The research is being conducted using scholarly journal information on the topic and accessing information that other hospitals have collected. This research is still in progress, but results will be complete for the conference. The information collected when the research is complete could be beneficial to the hospital staff, especially those who work with newborn infants.

## **Twelve Week Spirituality Curriculum Implementation**

Kristopher Jaeger (Department of Social Work)

*Christine Black-Hughes, Faculty Mentor (Department of Social Work)*

During the afternoons at Omegon Regional Treatment Center, clients attend one hour groups that address different aspects of their recovery. One of the groups that has been flagged as needing a new curriculum is the spirituality group. There are two major concerns regarding the current spirituality curriculum. The first one being that the current curriculum does not address the possibility that a client is unwilling to accept formal religion or is an atheist. The second issue is that the current curriculum is not user friendly. A facilitator who does not have an extensive background in spirituality will struggle running this group. The purpose of rewriting this curriculum is to address these two issues so the atmosphere of the group promotes fun intellectual discussion relating to spirituality. This research project will conduct interviews with spiritual leaders and an analytical review of the literature to select a spirituality model that would be most appropriate for the population. Once the research is complete, a twelve week curriculum will be built and presented to the staff. When approved, the curriculum will be implemented into Omegon's spirituality group.

### **The Effectiveness of Monitored Antabuse Treatment**

Katie Meuwissen (Department of Social Work)

*Laura Strunk, Faculty Mentor (Department of Social Work)*

The purpose of this research is to determine the effectiveness of monitored antabuse treatment as compared to antabuse treatment. Since in the monitored antabuse treatment, the clients have to go to a monitored treatment place to have someone watch them take the antabuse, the monitored antabuse treatment should be more effective than just the antabuse treatment. The methods that are being used for this research are interviews and scholarly journal articles. This research is in progress, and the results will be available at the undergraduate research conference. This research is relevant to the Scott County Human Services because if the research shows that monitored antabuse treatment is more effective, then they will use this research to try and bring it to the board to get them to approve a monitored antabuse treatment facility right at the county. The research findings in progress should be interesting to others because there are not many monitored antabuse treatment programs outside of the metropolitan area, which is one of the main reasons why many people do not like to go to monitored antabuse treatment facilities because they are too far away. If research shows that monitored antabuse treatment is effective it could bring a new treatment facility that is closer so that more people would be willing to participate.

### **Developmental Disability waiver satisfaction survey done at the Southern Minnesota County**

Hyojin Lee (Department of Social Work)

*Laura Strunk, Faculty Mentor (Department of Social Work)*

Satisfaction survey based on clients who receive services through Developmental Disability (DD) waiver program in a Southern Minnesota County was conducted. The result of satisfaction survey will reflect the quality of services that are provided to clients and assist finding improvements of service plan with DD waiver program. The satisfaction survey was sent to the clients who are on DD waiver program in southern Minnesota County. Considering the client's general low intelligence, the surveys were sent to their guardians or parents (including cases of children under 18). Fourteen multiple choice questions that respondents can choose either strongly agree, agree, unsure, disagree, strongly disagree, or do not apply. The survey also included four open ended questions. Total number of survey sent to guardians is 70. Most clients owned private guardianship including minor children and six of them had guardianship from social work agency. Criteria that were used during the audit, several social work values were reflected to the survey questions. This research project is process and the results will be available at a later date. Suggestions and improvements to improve social services in Southern Minnesota County will be discussed after collecting data.

### **The effect of teaching study skills and strategies to children with ADD/ADHD**

Amber L. Koziolk (Department of Social Work)

*Laura L. Strunk, Faculty Mentor (Department of Social Work)*

The effect of teaching study skills and strategies to children who have ADD/ADHD was examined. It was determined if teaching these skills have an effect on academic performance within the classroom setting. The hypothesis was that teaching study skills and strategies to children with ADD/ADHD improves academic performance. Three small groups of students with ADD/ADHD were taught study skills and strategies. Classroom teachers were asked to fill out evaluations on whether the student had improved their academic performance after learning these skills. This research was in the process and results were available by the time of the Undergraduate Research Conference. This research topic was selected because of an interest in strategies for working with children with ADD/ADHD. This disorder affects many children within the K-12 school system and most struggle academically. Learning study skills and strategies could be beneficial to these children and possibly improve academic performance.

### **The Impact of ‘Youth First Community of Promise’ and After School Programming on Young People**

Ashley Skaalerud (Department of Social Work)

*Laura Strunk, Faculty Mentor (Department of Social Work)*

This research project incorporated designing an instrument that measured the effects of after school programming on middle and high schoolers specifically involved in Youth First Community of Promise (YFCoP). It assessed both academic and non-academic progress throughout the school year. The five promises of “America’s Promise: Alliance for Youth” which Youth First orients itself under as goals were also be measured. The five promises include caring adults, safe places, healthy start, effective education, and opportunities to serve. This research is still in progress and results will be completed by presentation date. This information is relevant to YFCoP so that they are able to track specific measures of what their program offers. It is anticipated that the results of this research project will find that not only does YFCoP involvement increase students overall functioning but succeeds in meeting the needs of the population served and 'America's Promise' is being fulfilled effectively.

## Psychology

### **Using Flow to Enhance the Experience of Working**

Matthew S. Smith (Department of Psychology)

*Kristie L. Campana, Faculty Mentor (Department of Psychology)*

### **The Effects of Dissonance and Consonance within Music on the Cognitive Performance of Introverted and Extroverted Individuals**

Brian Follick (Department of Psychology)

*Karla Lassonde, Faculty Mentor (Department of Psychology)*

### **The Relationship between Proactive Personality and Recovery Experiences**

Heidi Doerr (Department of Psychology)

*Lisa Perez, Faculty Mentor (Department of Psychology)*

### **A New College Climate, An Old Problem: Exploring Ageism on Campus**

Jessica Breuer (Department of Psychology)

*Jeffrey Buchanan, Faculty Mentor (Department of Psychology)*

### **Perceptions of H1N1**

Samuel Martin (Department of Psychology)

*Karla Lassonde, Faculty Mentor (Department of Psychology)*

### **Examining the Relationships between Self-esteem Variables and Mental Health in Young Girls**

Rachel Kruger (Department of Psychology)

*Sarah K. Sifers, Faculty Mentor (Department of Psychology)*

\*Recipient of Minnesota State University, Mankato Foundation Grant

## **Using Flow to Enhance the Experience of Working**

Matthew S. Smith (Department of Psychology)

*Kristie L. Campana, Faculty Mentor (Department of Psychology)*

Many workers experience stress at work. A possible way to decrease feelings of stress and increase job satisfaction is by increasing the time people experience flow in their jobs. Flow is what Csikszentmihalyi (1991) stated people feel when they are at the peak of their creativity and performance. Flow makes people feel as though they are more fulfilled, and it has been shown to increase job satisfaction and productivity (Fullager & Kelloway, 2009). In this study, I analyzed how flow moderates the relationship between stress and job satisfaction in the nursing profession. That is, does flow act as a buffer by increasing job satisfaction levels even though the job may be extremely stressful? Online surveys were given to approximately 100 nurses at a hospice care center in Milwaukee, Wisconsin. This daily survey asked them questions regarding how stressed they were, their self-rating of job satisfaction, and how often they experienced characteristics of flow. The surveys were collected over a period of ten days at the end of each work day. I expected to find that if flow was present, it would lead to higher levels of job satisfaction. I also expected to find that flow correlated with lower levels of stress. The findings of this study can potentially urge employers to design their workplace so that flow can be achieved more often. Moreover, the findings can show employees that their experience of work can be vastly improved by utilizing flow.

## **The Effects of Dissonance and Consonance within Music on the Cognitive Performance of Introverted and Extroverted Individuals**

Brian Follick (Department of Psychology)

*Karla Lassonde, Faculty Mentor (Department of Psychology)*

Dissonance is a musical term describing compositional pieces with harsh overtones and an overall level of disagreeability between notes. Consonance is a descriptor for a piece of music that has a feeling of stability and comfort. While there has been much research within the psychological community as to how classical music can affect an individual's cognitive performance, little investigation has been done to look at how the note structure and overall compositional tone of a piece of music influences cognitive performance. In this study we investigated how musical structure can affect a piece's ability to aid or hinder cognitive performance within individuals of varying personality types. Fifty undergraduates in psychology from MSU, Mankato were asked to complete a mental rotation task and a stoop task, two measures of cognitive processing, while exposed to one of three categories of sound: dissonant music, consonant music or white noise. Following their completion of these tasks, they were asked to complete a 50 item version of the International Personality Item Pool or IPIP as a measure of their personality traits. Research suggests that an individual's level of introversion or extroversion may influence how music affects performance on cognitive tasks (Bodner, E., Gilboa, A., & Amir, D., 2007). We expected to find that individuals with extroverted personalities would score higher while exposed to dissonant music than when exposed to consonant music or white noise. We also expected that introverted individuals' performance would suffer on the cognitive tasks while exposed to dissonant music when compared to their extroverted counterparts.

## **The Relationship between Proactive Personality and Recovery Experiences**

Heidi Doerr (Department of Psychology)

*Lisa Perez, Faculty Mentor (Department of Psychology)*

Recovery is the way in which an individual unwinds from performing some type of work, for instance, at the end of a work day or work week. Proactive personality is characterized by a desire for control, good organizational skills, and the ability to adapt to various surroundings. The current study examined the relationship between recovery from work-related stressors and proactive personality and these two factors relate to strain outcomes such as need for recovery. This study specifically evaluated workload as a job stressor that necessitates recovery processes by individuals. We then examined whether engaging in specific recovery experiences (e.g., relaxation or mastery experiences) and specific personality traits (e.g., proactive personality) moderated the relationship between workload and strain outcomes (e.g., need for recovery). Individuals with proactive personalities may respond to stressors and approach recovery from stressors differently than those who are not proactive. Thus, we anticipated that there would be a weaker relationship between workload and need for recovery among those with proactive personalities than among those without proactive personalities. We also hypothesized that individuals with proactive personality would be more likely to engage in mastery experiences as a recovery technique as opposed to detachment and relaxation during the recovery process. Furthermore, we explored the possibility that these recovery experiences might moderate the relationship between workload and need for recovery. A survey assessing each of these constructs was given to approximately 100 full-time working adults. Data collection is underway. Results, theoretical and practical implications, and limitations will be discussed.

## **A New College Climate, An Old Problem: Exploring Ageism on Campus**

Jessica Breuer (Department of Psychology)

*Jeffrey Buchanan, Faculty Mentor (Department of Psychology)*

Ageism is “any prejudice or discrimination against or in favor of an age group” (Palmore 1990). Ageism towards non-traditional students is often suspected or assumed, but it is unclear to what extent it exists. Non-traditional students make up 40% of the college population in the United States (Stokes 2006). The current study will investigate to what extent ageism exists on college campuses. A sample of 200 college students of varying ages will participate in this study. Participants will be randomly assigned to one of two conditions. In the first condition, participants will read a scenario depicting a traditional-aged college student engaging in a variety of behaviors (e.g., frequent hand-raising, asking off-topic questions) in a college classroom. In the second condition, participants will read an identical scenario, but the student depicted will be a non-traditional student. Participants will then be asked to complete a survey about their reactions to the scenario. The survey will ask participants about how they would feel if they were actually in the situation presented in the scenario, what their opinions are about the student depicted in the scenario, and how they think the professor described in the scenario should respond to the student’s behavior. It is hypothesized that participants reading the scenario involving a non-traditional student will respond more negatively toward the student depicted in the survey compared participants reading the scenario involving a traditional-aged student. This study may provide valuable information concerning how the behavior of non-traditional students in college classrooms is perceived.

## **Perceptions of H1N1**

Samuel Martin (Department of Psychology)

*Karla Lassonde, Faculty Mentor (Department of Psychology)*

In this study, we assessed students' perceptions of the H1N1 virus based on research done on unrealistic optimism. Individuals demonstrate unrealistic optimism concerning a health risk when they view themselves as being less susceptible to a health risk than their peers without any logical reason for doing so. Eighty students in the psychology department participated in a three-part survey measuring their perceptions of H1N1, perceived risk for H1N1, and unrealistic and dispositional optimism. We expect to find that on average, students will perceive themselves as being less at risk for getting H1N1 than their peers. We expect that some moderators for unrealistic optimism will be the extent to which the student was exposed to others that contracted the virus and whether they contracted the virus themselves. We also expect to find that the higher a student's dispositional optimism, or how optimistic they are in general, the more unrealistically optimistic they will be towards H1N1. A danger of being unrealistically optimistic towards a health risk such as H1N1 is that this unrealistic optimism could make individuals feel overly at ease to the point where they do not partake in preventative behaviors. These individuals may also be less willing to seek proper treatment.

## **Examining the Relationships between Self-esteem Variables and Mental Health in Young Girls**

Rachel Kruger (Department of Psychology)

*Sarah K. Sifers, Faculty Mentor (Department of Psychology)*

\*Recipient of Minnesota State University, Mankato Foundation Grant

Mental health problems can make it difficult to succeed and function in daily life. In order to prevent serious issues from arising, factors that influence mental health must be identified. This study examined how mental health is impacted by self-esteem variables, specifically self-perceived social acceptance, physical appearance, and behavioral conduct, in approximately 40 girls, third through fifth grade. Past studies have compared each of these self-esteem variables to aspects of mental health and found connections between them in different populations. This study determined if these conclusions are true in prepubescent girls, an age group often neglected in research. To complete this study, participants were tested at two time periods (Time 1 and Time 2), separated by a span of twelve weeks. They completed self-esteem and mental health measures at both sessions. Preliminary results revealed that social acceptance and behavioral conduct at Time 1 predicted mental health at Time 2 after controlling for mental health at Time 1. With perceived social acceptance and behavioral conduct being linked to mental health, parents and teachers may address problems at an early stage. By monitoring children's self-esteem in these and other areas, preventive measures may be taken to ensure that children are successful at home and in school.

Mathematics & Statistics, Computer Science, Electrical & Computer Engineering & Technology and Biological Sciences

**Identification of Polynomial Combinations of Operators**

Tova Lindberg (Department of Mathematics & Statistics)

*Namyong Lee, Faculty Advisor (Department of Mathematics & Statistics)*

*\*Recipient of Undergraduate Research Conference Large Grant*

**Special Matrices and Their Properties**

Brian Barthel (Department of Mathematics & Statistics)

*In-Jae Kim, Faculty Mentor (Department of Mathematics & Statistics)*

**Mathematical Modeling and Analysis of Chemotherapy Strategy in the Treatment of HIV**

Yu-Jeong Kim (Department of Mathematics & Statistics)

Jaehwan Byun (Department of Bio-technology)

Hyuck Jin Lee (Department of Biochemistry)

*Namyong Lee, Faculty Mentor (Department of Mathematics & Statistics)*

*Anne-Marie Hoskinson, Faculty Mentor (Department of Biological Sciences)*

**Stage Based Population Model for a Harvested Population of Fisher**

Daniel Branscombe (Department of Mathematics & Statistics)

*Namyong Lee, Faculty Mentor ((Department of Mathematics & Statistics)*

*Anne-Marie Hoskinson, Faculty Mentor (Department of Biological Sciences)*

**An Automatic Dialog System for Student Advising**

Brian McMahan (Department of Computer Science)

*Rebecca Bates, Faculty Member, (Department of Computer Science)*

**Improvements to a Course Management System Using Software Engineering Principles**

Fatima-Zohra Cherkaoui El Moursli (Department of Computer Science)

Khushboo Shakya (Department of Computer Science)

*Steven Case, Faculty Mentor (Department of Computer Science)*

*Jeffrey Henline, Research Supervisor (Information and Technology Services)*

**Derivation of a Parallel Algorithm for the Simulation of Pulse Propagation in Optical Fiber Using a Signal Processing Convention**

Md Jamy (Department of Electrical & Computer Engineering & Technology)

Erik Morness (Department of Electrical & Computer Engineering & Technology)

*Qun (Vincent) Zhang, Faculty Mentor (Department of Electrical & Computer Engineering & Technology)*

*Dinesh Manandhar, Faculty Mentor (Department of Electrical & Computer Engineering & Technology)*

**Herd Immunity and the Necessity of Vaccinations: Modeling the Effects of MMR Vaccinations**

Caitlyn Cardetti (Department of Biological Sciences and Mathematics & Statistics)

Katie Groskreutz (Department of Biological Sciences and Mathematics & Statistics)

Melissa Zins (Department of Biological Sciences and Mathematics & Statistics)

*Anne-Marie Hoskinson, Faculty Mentor (Department of Biological Sciences)*

*Namyong Lee, Faculty Mentor (Department of Mathematics & Statistics)*



### **Identification of Polynomial Combinations of Operators**

Tova Lindberg (Department of Mathematics & Statistics)

*Namyong Lee, Faculty Advisor (Department of Mathematics & Statistics)*

\*Recipient of Undergraduate Research Conference Large Grant

In mathematical analysis, an important tool is the set of eigenvalues of an operator, which tells us something about the size of that operator. In algebra, addition and multiplication are actually important tools that help us understand how operators interact with each other. In this research project, we use these tools together in a new way to study combinations of operators. Using these tools, we take a particular combination of operators and see if we can work backwards through the combination to find out what the original operators were. This research project is focused on identifying which combinations will preserve the original operators so that we can tell exactly what those original operators were. The results of this project are then used by mathematical analysts in their study of abstract objects called algebras of bounded linear operators on Banach spaces.

### **Special Matrices and Their Properties**

Brian Barthel (Department of Mathematics & Statistics)

*In-Jae Kim, Faculty Mentor (Department of Mathematics & Statistics)*

In this presentation, we will study special kinds of matrices appearing in various applications such as mathematical biology, numerical analysis and control theory. We mainly study their spectral properties and present examples of applications where the spectral properties play a significant role for the applied problems.

## **Mathematical Modeling and Analysis of Chemotherapy Strategy in the Treatment of HIV**

Yu-Jeong Kim (Department of Mathematics & Statistics)

Jaehwan Byun (Department of Bio-technology)

Hyuck Jin Lee (Department of Biochemistry)

*Namyong Lee, Faculty Mentor (Department of Mathematics & Statistics)*

*Anne-Marie Hoskinson, Faculty Mentor (Department of Biological Sciences)*

The World Health Organization has reported that Acquired Immune Deficiency Syndrome (AIDS) has been found to be the second leading cause of death by diseases. Therefore, the importance of treating the disease has been greatly emphasized. These days, scientists have suggested that chemotherapy could be the most effective way of treating AIDS. We built a mathematical model of dynamics of the Human Immunodeficiency Virus (HIV) through a system of differential equations, which describes the interactions between the HIV and T-cells that are immune cells attacked by the HIV. The model produced the concentration rate of infected and uninfected T-cells over time when there is a medical intervention, called chemotherapy. We mathematically analyzed the dynamics of the immune system and the HIV and performed the computer simulations for various chemotherapy strategies.

## **Stage Based Population Model for a Harvested Population of Fisher**

Daniel Branscombe (Department of Mathematics & Statistics)

*Namyong Lee, Faculty Mentor (Department of Mathematics & Statistics)*

*Anne-Marie Hoskinson, Faculty Mentor (Department of Biological Sciences)*

The fisher (*Martes pennanti*) is a medium-sized carnivorous mammal and an important furbearing species. Fishers have a low reproductive rate and are easily trapped. These factors, in addition to habitat loss and overharvest, nearly brought the species to extinction. In Minnesota, harvest management has been fairly successful in maintaining the fisher population. For continued success an accurate model of population growth is needed. To predict trends in fisher populations, we built a stochastic Lefkovitch stage-based matrix model. A stochastic model is one in which probability distributions are used for the values of the variables involved, allowing for a more accurate depiction of population growth. The Lefkovitch matrix predicts future population levels by dividing a population into various developmental stages, such as juvenile, sub-adult, and adult. Rates of fecundity, mortality, and survival into the next stage were defined for each of the stages. Due to the lack of specific demographic variables for fisher populations in Minnesota, we used data from populations in several other similar regions. We tested the sensitivity and elasticity of this model and found that it was most sensitive to harvest mortality. Results from this model will allow managers to make more informed decisions on fisher harvest regulations.

## **An Automatic Dialog System for Student Advising**

Brian McMahan (Department of Computer Science)

*Rebecca Bates, Faculty Member, (Department of Computer Science)*

Automatic dialog systems are an implementation of natural language processing theory with the goal of allowing the use of natural sentences to communicate with a computer system. The general purpose of this project was to design and implement an automatic dialog system for augmenting university student advising. Student advising is a relatively narrow domain of possible questions and responses. The automatic dialog system focused on prescriptive advising rather than developmental advising to further narrow the domain to scheduling and registration matters. Student advisors were interviewed and recorded during mock advising sessions in order to best model the interaction between students and their advisors. The phrases and advising information have been encoded using AIML (Artificial Intelligence Markup Language) and the dialog system has been implemented in the programming language Python. To test it for quality, the system was used by students and advisors. Future work includes expanding the database to include information directly from the Minnesota State University, Mankato student registration system as well as to implement a spoken language interface.

## **Improvements to a Course Management System Using Software Engineering Principles**

Fatima-Zohra Cherkaoui El Moursli (Department of Computer Science)

Khushboo Shakya (Department of Computer Science)

*Steven Case, Faculty Mentor (Department of Computer Science)*

*Jeffrey Henline, Research Supervisor (Information and Technology Services)*

The widespread development of technology and the need for a good course management method in educational institutions have led to development of various online course management systems. Universities have adopted a variety of different systems that fulfill their requirements in the most efficient way possible at the time the systems are adopted. However, regardless of the various services provided, these systems still lack various functionalities that result in unmet system course management requirements. The objective of this project is to research various aspects of a course management system, identify one or more ways to improve the features of the system, and then (as practical) design and implement one or more of the improvements. Since Minnesota State University, Mankato is currently using Desire2Learn as a course management tool; this research will be based on this specific course management tool. During this process, we will be applying Software Engineering principles for software development. Software engineering principles include requirement engineering (requirement elicitation, requirement analysis negotiation, requirement validation and requirement management), design, coding, implementation and testing.

## **Derivation of a Parallel Algorithm for the Simulation of Pulse Propagation in Optical Fiber Using a Signal Processing Convention**

Md Jamy (Department of Electrical & Computer Engineering & Technology)

Erik Morness (Department of Electrical & Computer Engineering & Technology)

*Qun (Vincent) Zhang, Faculty Mentor (Department of Electrical & Computer Engineering & Technology)*

*Dinesh Manandhar, Faculty Mentor (Department of Electrical & Computer Engineering & Technology)*

Performance evaluation and system design of fiber optical communications rely heavily on the simulation of optical pulses propagating in optical fiber. As a result, efficient and accurate numerical solution to the nonlinear Schrödinger equation, which governs the optical pulse propagation, is highly desirable in the field of optical communications. Using a signal processing convention, we derived a fully parallel numerical algorithm to simulate optical pulse propagation in the nonlinear, dispersive, and single mode optical fiber. We also gave a detailed description on the step-by-step implementation of the algorithm. The derived parallel algorithm can use  $M$  central processing units (CPUs) to simulate the  $M$  simulation steps in one span of the optical fiber that is approximately 100 km long, with computational complexity of  $N \log_2 N$  per CPU ( $N$  is the number of time samples in the simulated pulse train which represents the transmitted bit sequence i.e., the sequences of transmitted ones and zeros). In contrast, the computational burden is  $MN \log_2 N$  when using the standard Split-Step Fourier (SSF) simulation method, where only one CPU can be used due to the serial nature of the SSF algorithm. The derived parallel algorithm is significant and can find applications for time-critical system simulation/design tasks in fiber optical communications.

## **Herd Immunity and the Necessity of Vaccinations: Modeling the Effects of MMR Vaccinations**

Caitlyn Cardetti (Department of Biological Sciences and Mathematics & Statistics)

Katie Groskreutz (Department of Biological Sciences and Mathematics & Statistics)

Melissa Zins (Department of Biological Sciences and Mathematics & Statistics)

*Anne-Marie Hoskinson, Faculty Mentor (Department of Biological Sciences)*

*Namyong Lee, Faculty Mentor (Department of Mathematics & Statistics)*

The MMR vaccination is a two dose vaccine given to children between the ages of 12 – 15 months and the second dose between the ages of 4 – 6 years to prevent measles, mumps, and rubella. The objective was to mathematically model the effects of the MMR vaccinations in a hypothetical school through multiple compartment and spatial models. These models were based on each disease individually with their respective vaccine effectiveness and disease infection rates. These models demonstrated the limits of herd immunity. Herd immunity occurs when a high enough percentage of the population is immune or vaccinated to prevent the spread of diseases to those who are susceptible. Once herd immunity was determined, the necessity of the vaccinations became evident. This model demonstrated the effects of not vaccinating a child and how it affected not only the individual but the whole population. Through this, parents, educators, and public health officials can be educated on the importance of getting children vaccinated.

Sociology & Corrections and Gender & Women's Studies

**Strategies Methamphetamine Addicts Devise As They Go Through Treatment:  
A Research Proposal**

Phillip Buzzard (Department of Sociology & Corrections)

*William Wagner, Faculty Mentor (Department of Sociology & Corrections)*

**Purity Balls, Abstinence, and Patriarchy: Controlling Girls' Bodies and Minds**

Nicole Bourdeau (Department of Gender & Women's Studies)

*Emily Boyd, Faculty Mentor (Department of Sociology & Corrections)*

**The State of Black Criminology: A focus group of the perspectives of African American  
Criminologists.**

Briana Threath (Department of Sociology & Corrections)

Brooke Alexander (Department of Sociology & Corrections)

*Sherrise Truesdale-Moore, Faculty Mentor (Department of Sociology & Corrections)*

**Gender Identity and the Gym**

Jacob Mulcahy (Department of Sociology & Corrections)

*Afroza Anwary, Faculty Mentor (Department of Sociology & Corrections)*

**Teaching Critical Sociology: The Consequences of Pursuing a Critical Pedagogy**

Abdihakim Abdi (Department of Political Science)

*Paul Prew, Faculty Mentor (Department of Sociology & Corrections)*

**Pro-Choice and Pro-Life Contemporary Ideologies and Conflicts: Finding a Site for Common Ground**

Savanna Peterson-Wahl (Department of Gender & Women's Studies)

*Barbara Keating, Faculty Mentor (Department of Sociology & Corrections)*

*Helen Crump, Faculty Mentor (Department of Gender & Women's Studies)*

## **Strategies Methamphetamine Addicts Devise As They Go Through Treatment:**

### **A Research Proposal**

Phillip Buzzard (Department of Sociology & Corrections)

*William Wagner, Faculty Mentor (Department of Sociology & Corrections)*

The behavioral strategies methamphetamine addicts employ as they go through treatment are not well understood and are difficult to research. Some of these strategies lead to a life free from addiction and others protect, hide and even foster a continued commitment to addiction. This research proposal provides a model for doing research on the social mechanisms that are not understood well enough to provide direction for more effective treatment programs. The proposal presents an assessment of the seriousness of the problem with methamphetamine addiction, a review of the literature on the methamphetamine addict and on the treatment programs used to assist the addict. This information provides a foundation for applying Labeling and Attribution theory as an explanation for the emergence of specific behavioral strategies in meth addicts. To determine whether or not these theoretical explanations can be supported, hypotheses have been set out and a methodology to test them with a sample of methamphetamine addicts has been developed. A longitudinal qualitative methodology is suggested as a means to demystify and demythologize the strategies and barriers that characterize the struggle addicts face and to provide empirical insights needed to program meaningful assistance.

## **Purity Balls, Abstinence, and Patriarchy: Controlling Girls' Bodies and Minds**

Nicole Bourdeau (Department of Gender & Women's Studies)

*Emily Boyd, Faculty Mentor (Department of Sociology & Corrections)*

The first purity ball was held in 1998, just two years after abstinence-only education was implemented into public schools after receiving almost half a billion dollars in funding nationwide. Abstinence-only education has taught many young girls across the country that there is no such thing as safe sex and that they must control themselves and avoid sex at all cost. Purity balls are an attempt to make girls feel special and loved by their fathers, but the language and messages used during these events produce more of a controlling and limited relationship rather than a loving, open, and honest one. Using content analysis, I examined the current information already compiled on abstinence-only education and purity balls and their effects on young girls. I have analyzed these sites with a feminist lens that attends to the connections between these movements and the oppressive force of patriarchy on the lives of young girls in the United States. The popular, commercialized abstinence movement teaches girls that their worth is dependent on their purity, which is controlled by men – be it their fathers, husbands, or a random guy on the street. Consequently, girls are not taught how to protect themselves and love their bodies, but are set-up for failure in a game they can never win.

## **The State of Black Criminology: A focus group of the perspectives of African American Criminologists.**

Briana Threatt (Department of Sociology & Corrections)

Brooke Alexander (Department of Sociology & Corrections)

*Sherrise Truesdale-Moore, Faculty Mentor (Department of Sociology & Corrections)*

According to Minnesota State University, Mankato, diversity is a commitment to create an understanding and appreciation of diverse peoples and diverse perspectives; a commitment to create an academic, cultural workplace environment and community that develops mutual respect for all and celebrates our differences. Realizing that all perspectives cannot be easily addressed by any one course, Diverse Culture Graduation Requirements implemented Corrections courses under its Goal1, that failed to address or include perspectives of African American criminologists. To date, the Criminal Justice textbooks used in Corrections 106 and Corrections 444 do not include any African American criminologist's perspective. From this study we hoped to gain a better understanding of African American criminologist perspectives on criminal justice and corrections policy. We hoped that our findings would have an impact on the corrections department and its faculty as well as encourage the implementation of a more diverse curriculum. In order to gain a better insight into the perspective of African American criminologist a focus group was conducted to examine two issues; their attitudes towards criminal justice punitive policy in the criminal justice system and the exclusion of their perspectives within in the classroom.

## **Gender Identity and the Gym**

Jacob Mulcahy (Department of Sociology & Corrections)

*Afroza Anwary, Faculty Mentor (Department of Sociology & Corrections)*

Recently, there is a growing interest in fitness and healthy lifestyles. Simultaneously, there is an increase in the number of people from various socio-cultural backgrounds interested in the membership of fitness clubs. Similar to the larger society, different gender ideologies, identities, and hierarchies are produced and reproduced by the members of the health clubs within these clubs. The past decade has produced numerous studies in the area of gender space and hegemonic masculinity in contemporary society. Using ethnographical research and observation method, this research examines how gendered spaces, hegemonic hierarchies of athletic prowess, fitness knowledge, gender, physique, rituals, and strength are reproduced and dominate a college campus recreational center. The data reveals multiple gender transgressions by the cliental when entering the space dominated by the opposite gender. By utilizing the ideologies that dominate diverse members of the health clubs, this paper contributes to our understanding of the social interactions of male and female participants within these fitness institutions. This research questions whether or not health club cliental challenge what the college campus fitness clubs perceives as a gender-neutral space?

## **Teaching Critical Sociology: The Consequences of Pursuing a Critical Pedagogy**

Abdihakim Abdi (Department of Political Science)

*Paul Prew, Faculty Mentor (Department of Sociology & Corrections)*

While there has been a great deal of literature dealing with critical pedagogy and also a separate literature dealing with students' perceptions of bias in the classroom, there has been little that looked at the relationship between the two. Professor Prew's course used a critical pedagogy and approached sociology from a variety of perspectives, but it was still perceived by some students as a single "liberal" perspective or his own opinion. In casual observation, we noticed that evaluations that tended to contain negative comments about Dr. Prew's perspective tended to be lower than the class average. In this paper, we reviewed and coded the written comments on Dr. Paul Prew's Sociology 101 course evaluations for the past 3 years to assess whether there is a correlation between the quantitative feedback on evaluations and the qualitative comments. Using correlations, means and Anova, we specifically tested to see if the qualitative comments that contain overtly negative assessments of Dr. Prew's perspective in the course were significantly more negative than those that are neutral or complimentary regarding his perspective. The findings tended to support this hypothesis.

## **Pro-Choice and Pro-Life Contemporary Ideologies and Conflicts: Finding a Site for Common Ground**

Savanna Peterson-Wahl (Department of Gender & Women's Studies)

*Barbara Keating, Faculty Mentor (Department of Sociology & Corrections)*

*Helen Crump, Faculty Mentor (Department of Gender & Women's Studies)*

Abortion has been a hot topic in politics. In order to open a space for knowledgeable activism and discussion on this controversial issue, I conducted a content analysis of literature on pro-choice and pro-life standpoints and areas of conflict. In addition, I analyzed two websites, one pro-choice and one pro-life, that have local as well as national significance. This analysis was centered on the websites' abilities to put their standpoints into practice. Combining these analyses provided an overview of contemporary reproductive rights' standpoints and conflicts. The wide range of stances gave people the opportunity to gauge their personal views within a larger political context. Ultimately, the main goal was to give people the ability to informedly gauge their personal and political stances and instigate political action.





## INDEX OF STUDENTS

Abdi, Abdihakin .....	96, 99	Duale, Ayan .....	54, 61
Abdirahman, Sagal .....	53, 57	Duroshola, Oluwabusola.....	68, 71
Alexander, Brooke.....	96, 98	Enfield, Nicole E.....	54, 63
Ali, Sahra Ahmed .....	9, 11	England, Katherine .....	18, 19
Anderson, Hallie.....	72, 75	Falck, Samantha.....	72, 78
Appel, Jessica .....	24, 32	Follick, Brian .....	87, 88
Ayers, Trista L.....	25, 36	Fors, Anna-Kjersten.....	18, 22
Barnett, Samantha.....	72, 77	Foster, Brittany A.....	54, 55, 63, 64
Barnhart, Ryan.....	73, 83	Gaines, Nicolas .....	41, 43
Barthel, Brian .....	91, 92	Gerbensky, Susan.....	23, 28
Bartz, Emily.....	50, 51	German, Jessica.....	23, 29
Beal, Lauren .....	46, 47	Gilbert, Nicole.....	25, 37
Becker, Anita .....	24, 32	Greiner, Amanda.....	72, 76
Belgarde, Joseph.....	25, 37	Groskreutz, Katie .....	91, 95
Bennett, Brent.....	41, 44	Hamilton, Michael A. ....	54, 62, 64
Biesanz, Isaiah F.....	54, 55, 63, 64	Hanninen, Eric .....	26, 40
Borchardt, Carissa A. ....	54, 55, 64, 66	Hanson, Dwight .....	23, 27
Bourdeau, Nicole .....	96, 97	Hanson, Adam.....	25, 36
Braband, Josh .....	24, 33	Hanson, Melissa.....	25, 37
Branscombe, Daniel .....	91, 93	Harding, Lauren .....	6, 7
Breuer, Jessica .....	87, 89	Harsma, Kristin J. ....	68, 69
Brielmaier, Elizabeth.....	55, 65	Heaney, Kelly .....	50, 52
Bruns, Eric .....	41, 42	Helgeson, Dawn.....	18, 20
Buzzard, Phillip .....	96, 97	Helget, Jenna.....	55, 67
Byun, Jaehwan.....	91, 93	Heller, Erik.....	53, 57
Califano, Taryn.....	54, 61	Hogberg, Kelli.....	54, 61
Cardetti, Caitlyn .....	91, 95	Holmberg, Sara .....	53, 59
Cardoni, Lauren .....	54, 62	Hopkins, Patricia D.....	54, 55, 63, 64, 66
Carsten, James .....	41, 43	Hunter, Anthony .....	14, 17
Cedergren, Caylin C. ....	73, 84	Hyland, Molly J. ....	14, 15
Cherkaoui El Moursli, Fatima-Zohra .....	91, 94	Jaeger, Kristopher .....	73, 84
Chiodo, Meghan .....	26, 40	Jamy, Md.....	91, 95
Christenson, Jessica.....	55, 67	Jansen, Kari.....	18, 21
Clymer, John.....	25, 36	Jobe, Bethany.....	72, 77
Colvin, Kim .....	72, 79	Johnson, Alicia J. ....	14, 15
Compton, Nick .....	25, 36	Karch, Brenda .....	73, 82
Cossalter, Spencer .....	26, 40	KC, Ashok Singh .....	25, 39
Cyr, Amanda.....	55, 65	Kerkaert, Stephanie.....	53, 59
Dalluge, Lindsay.....	53, 59	Keul, Ashley M.....	53, 59
Dam, Henry .....	25, 36	Kim, Ami .....	23, 30
Danielson, Devin .....	41, 43	Kim, Yu-Jeong.....	91, 93
Day, Jessica A. ....	54, 55, 63, 64	Kinthead, Lauren.....	24, 31
DeRosier, Vashti R. ....	14, 15	Koester, Amber .....	73, 81
Dick, Andy .....	41, 45	Kotten, Aimee L.....	54, 55, 64
Dobmeier, Joseph .....	26, 40	Koziolk, Amber L. ....	74, 86
Doerr, Heidi .....	87, 89	Kraayenbrink, Jacy N.....	54, 62, 63, 64
Domask, David.....	18, 19	Krohn, Ashley .....	18, 22
Dombrowsky, Alexander W.....	41, 44	Kruger, Rachel .....	55, 67, 87, 90

Kvenvold, Derek.....	41, 44	Ranginwala, Samee M. ....	25, 39
Larsen, Sheryl.....	72, 75	Richter, Mary .....	53, 56
Larson, Chris .....	41, 42	Rother, Janet Elizabeth .....	54, 60
LaSorsa, Paul.....	41, 43	Rupp, Jeremy .....	41, 45
Lee, Han .....	23, 27	Ruschmeyer, Maria.....	72, 80
Lee, Hojoon .....	25, 38	Sanchez, Alyssa .....	73, 82
Lee, Hyojin .....	73, 85	Sanford, Michael L. ....	41, 44
Lee, Hyuck Jin.....	91, 93	Sarameh, Ashraf.....	26, 40
Lenz, Melissa A.....	55, 66	Scheierl, Amber .....	9, 10
Lettow, Brittaney .....	50, 51	Schelling, Derek.....	25, 37
Lindberg, Tova .....	91, 92	Schmitt, Daniel .....	6, 8
Lips, Renee .....	6, 7	Schwanke, Jeremy.....	41, 42
Looft, Maggie .....	53, 58	Semahge, Betlehem A.....	18, 20
Lovaas, Meredith.....	23, 27	Shakya, Khushboo .....	91, 94
Maher, Ashley .....	46, 49	Shopek, Emily.....	72, 76
Malla, Chandani .....	26, 40	Shult, Matthew .....	41, 45
Manzo, Paulina .....	14, 16	Skaalerud, Ashley .....	74, 86
Martin, Samuel .....	87, 90	Smith, Matthew S.....	87, 88
McCune, Samantha.....	68, 70	Smith, Thomas G. ....	25, 36
McKelvogue, Brooke .....	24, 33	Somage, Chris P.....	53, 59
McMahan, Brian.....	91, 94	Sorensen, Carl J. ....	23, 29
Meger, Travis .....	53, 59	Sosebee, Jennifer.....	72, 79
Menne, Nicholas A. ....	24, 34	Steck, Margo .....	68, 69
Meuwissen, Katie .....	73, 85	Stelten, Lauren .....	9, 10
Milius, Inge E. ....	14, 16	Stepan, Lindsay.....	25, 38
Miller, Eric .....	24, 35	Tambi, Sandra .....	23, 30
Moe, Margaret .....	55, 66	Taylor, Katelyn .....	24, 32
Morales, Jessica M. ....	9, 12, 54, 63	Taylor, Crystal .....	23, 28
Morness, Erik .....	91, 95	Teshite, Derartu.....	53, 58
Moser, Jacob D.....	23, 29	Theede, Kiley .....	53, 58
Mrkvicka, Travis .....	24, 35	Thorn, Alicia.....	72, 78
Mulcahy, Jacob.....	96, 98	Thorne, James .....	23, 30
Nelsen, Donald J.....	46, 48	Threatt, Briana .....	55, 67, 96, 98
Nelson, Drew .....	6, 8	Timm, Naomi.....	9, 13
Ngum, Adeline .....	46, 49	Vander Hook, Joshua.....	25, 38
Nielsen, Heather .....	73, 83	Vinkemeier, Kristyn.....	73, 81
Nieman, Cassie .....	9, 12	Vonbergen, Amanda .....	9, 13, 55, 67
Nix, Adam .....	23, 29	Vroman, Tony .....	54, 60
Obidiegwu, Ifedi.....	23, 28	Wageman, Sarah .....	24, 31
Okitikpi, Cybill E. ....	24, 34	Wagner, Benjamin .....	68, 70
Olson, Natasha.....	55, 66	Wallin, Emily.....	53, 56
Opakunle, Yusuf.....	46, 47	Wandrie, Jessica.....	53, 56
Origer, Mark .....	23, 29	Weeramantri, Indumini A. ....	25, 36
Oswald, Merissa .....	46, 48	Weidert, Lacy A.....	73, 80
Peterson-Wahl, Savanna.....	96, 99	Wencel, Phillip.....	41, 45
Phillips, Amber E. ....	68, 70	Woodgate, Kimberly.....	9, 11
Ploeger, Marjorie J. ....	24, 35	Yoder, Samuel.....	41, 45
Proehl, Angela .....	18, 21	Zilles, Whitney.....	6, 7
Prokop, Christopher.....	25, 36	Zins, Melissa .....	91, 95
Ranginwala, Mohammad A.....	25, 39		

## INDEX OF FACULTY MENTORS

Albertson, Dawn N. ....	9, 13	Luebke, Judith.....	14, 16
Anwary, Afroza .....	96, 98	Lund, Bonnie.....	53, 56
Armentrout, Suzannah.....	14, 15, 16	Mackey, Theresa.....	14, 17
Bates, Rebecca.....	91, 94	Manandhar, Dinesh.....	91, 95
Beimers, David .....	6, 7	Martensen, Brian.....	25, 38
Bevacqua, Maria.....	18, 22	Mead, Gary .....	41, 42, 45
Black-Hughes, Christine... 6, 7, 72, 73, 79, 80, 81, 82, 83, 84		Panahon, Carlos J.....	54, 55, 62, 63, 64
Bond, Joye .....	53, 59	Perez, Lisa.....	87, 89
Boyd, Emily.....	2, 96, 97	Posas, Luis .....	18, 19
Brown, Tom.....	25, 38	Prew, Paul .....	96, 99
Buchanan, Jeffrey .....	9, 12, 87, 89	Purdue, Melissa.....	18, 21
Campana, Kristie L.....	2, 9, 11, 87, 88	Quirk Dorr, Danaé .....	24, 32, 34
Case, Steven .....	26, 40, 91, 94	Ries, Barry J.....	55, 66
Chambers, Jeff.....	14, 17	Rife, James.....	24, 25, 31, 34, 39
Cook, Bradley .....	46, 47	Roberts, Andrew D. ....	25, 36
Corley, Christopher .....	50, 52	Salerno, Theresa.....	23, 28, 29, 30
Crump, Helen .....	18, 19, 20, 21, 22, 96, 99	Sandell, Elizabeth .....	53, 58
Druschel, Stephen.....	23, 26, 29, 40	Secott, Timothy.....	24, 31
Duckett, Linda .....	68, 70	Sifers, Sarah K. ....	87, 90
Eimen, Alisa .....	68, 70	Stark, Emily .....	9, 13, 54, 55, 62, 65, 66
Evers, Craig .....	41, 43, 44	Strunk, Laura .... 54, 62, 72, 73, 74, 75, 76, 77, 78, 79, 83, 84, 85, 86	
Fisher, Shannon .....	46, 48	Swart, Daniel.....	23, 24, 30, 35
Fredstrom, Susan .....	53, 58, 59	Tebbe, Patrick .....	24, 25, 33, 37
Germundson, Curt .....	68, 69	Toma, Daniel P. ....	25, 37
Goellner, Geoffrey.....	23, 24, 27, 32, 35	Truesdale-Moore, Sherrise.....	55, 67, 96, 98
Hargrove, Patricia.....	53, 56	Vieceli, Jackie .....	18, 20
Hedman, Amy.....	53, 57	Visser, Mary.....	14, 15
Henline, Jeffrey .....	91, 94	Vorlicsek, Trent P.....	25, 36
Hilt-Panahon, Alexandra .....	54, 55, 64	Wagner, William.....	96, 97
Hoskinson, Anne-Marie .....	46, 49, 91, 93, 95	Waterkotte, Erik.....	68, 71
Houlihan, Daniel D.....	54, 63	Westerman-Wasicuna, Gwen.....	53, 58
Humphries, Jean .....	54, 60, 61	Wilkerson, Forrest.....	53, 59
Johnston, Mary .....	50, 51	Willemsen, Mathew .....	68, 71
Jones, Bruce.....	41, 43, 44, 45	Witt, Diane.....	54, 61
Kamphoff, Cindra.....	2, 14, 15, 16, 54, 60	Wrigley, Dorothy .....	46, 49
Keating, Barbara.....	96, 99	Zhang, Qun (Vincent) .....	91, 95
Kelley, Dean .....	25, 26, 38, 40		
Kim, In-Jae .....	91, 92		
Knoblich, Penny .....	23, 27, 28, 46, 47		
Krämer, Nadja .....	6, 8		
Krenz, John D.....	46, 48		
Kuechle, Lynn .....	53, 57		
Lassiter, Andrea.....	9, 10, 55, 65, 67		
Lassonde, Karla .....	9, 10, 12, 87, 88, 90		
Lauters, Amy .....	18, 22		
Lee, Namyong .....	91, 92, 93, 95		





UNDERGRADUATE RESEARCH CONFERENCE

MINNESOTA STATE UNIVERSITY, MANKATO

*A member of the Minnesota State Colleges and Universities System.  
Minnesota State University, Mankato is an Affirmative Action/Equal Opportunity University.  
This document is available in alternative format to individuals with disabilities by calling the Undergraduate Research Conference at  
507-389-1706 (V) or 800-627-3529 or 711 (MRS/TTY). GRAD154BK.0310*